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PROPOSAL FOR HYDROGEOLOGIC STUDY

HINSDALE - SEXTON LANDFILL

F05-8702-059

FIL0041GA

ILD00060647

December 23, 1987

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LIST OF ILLUSTRATIONS

1. INTRODUCTION

1.1 JUSTIFICATION FOR DRILLING

The United States Environmental Protection Agency (U.S. EPA) has authorized Ecology and Environment, Inc., Field Investigation Team (E & E - FIT) to reevaluate the Hinsdale-Sexton Landfill in the form of a hydrogeological investigation. The primary goal of this investigation is to accurately assess the site for the National Priorities List (NPL). The projected Hazardous Ranking System (HRS) score will increase to greater than 28.5 if source contaminants are detected in the groundwater via migration pathways. A hydrogeological investigation will provide documentation of the existing conditions for final NPL consideration.

1.2 OBJECTIVES

The primary goal of this investigation is to detect source contaminants and analyze the potential for migration of contaminants to the aquifer(s) of concern. The project will include:

- A monitoring well program designed to characterize the aquifer(s) of concern and to determine the hydraulic connection between aquifers;

- Collection of chemical data derived from soil boring, groundwater, soil, and surface water sampling used to confirm existing data and to provide a reliable database for satisfying HRS model requirements; and

- An assessment of the interaction between surface water drainage and groundwater pathways.

2. BACKGROUND

2.1 SITE DESCRIPTION/HISTORY

The Hinsdale-Sexton Landfill, operated by the John Sexton Sand and Gravel Corporation, is located in Hinsdale, Illinois. It is located east of, and directly adjacent to a major highway (I-294) and is bounded to the north and south by 22nd (Cermak Road) and 31st streets, respectively.

The site is a 275-acre landfill that accepted general municipal waste and wastewater treatment sludge from 1959 to 1984. The Illinois Environmental Protection Agency (IEPA) also permitted the disposal of special wastes at the site. The Sexton Corporation is leasing the property from Catholic Cemeteries until 1988. The landfill is no longer in operation.

Some of the special wastes disposed at the landfill include: municipal sludge, oil sludge waste, foundry sand, and slag totaling 56,071 cubic yards. These wastes contain low concentrations (E.P. toxicity) of cyanide, cadmium, nickel, chromium, lead, and zinc.

On October 4, 1984, U.S. EPA personnel sampled eight residential wells to the east of the landfill in which various concentrations of 1,1-dichloroethane were detected. One surface water and three soil/ sediment samples were also collected. The surface water sample, collected from a pond to the east of the landfill, contained very low concentrations of heavy metals and chloroform. A background sample was not collected.

Soil samples collected downslope and east of the landfill also contained very low concentrations of heavy metals. However, relatively higher concentrations of organic contaminants were also detected. These contaminants included pentachlorophenol, phenanthrene, fluoranthene, pyrene, benzo(k)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, benzo(ghi)perylene, and beta-BHC.

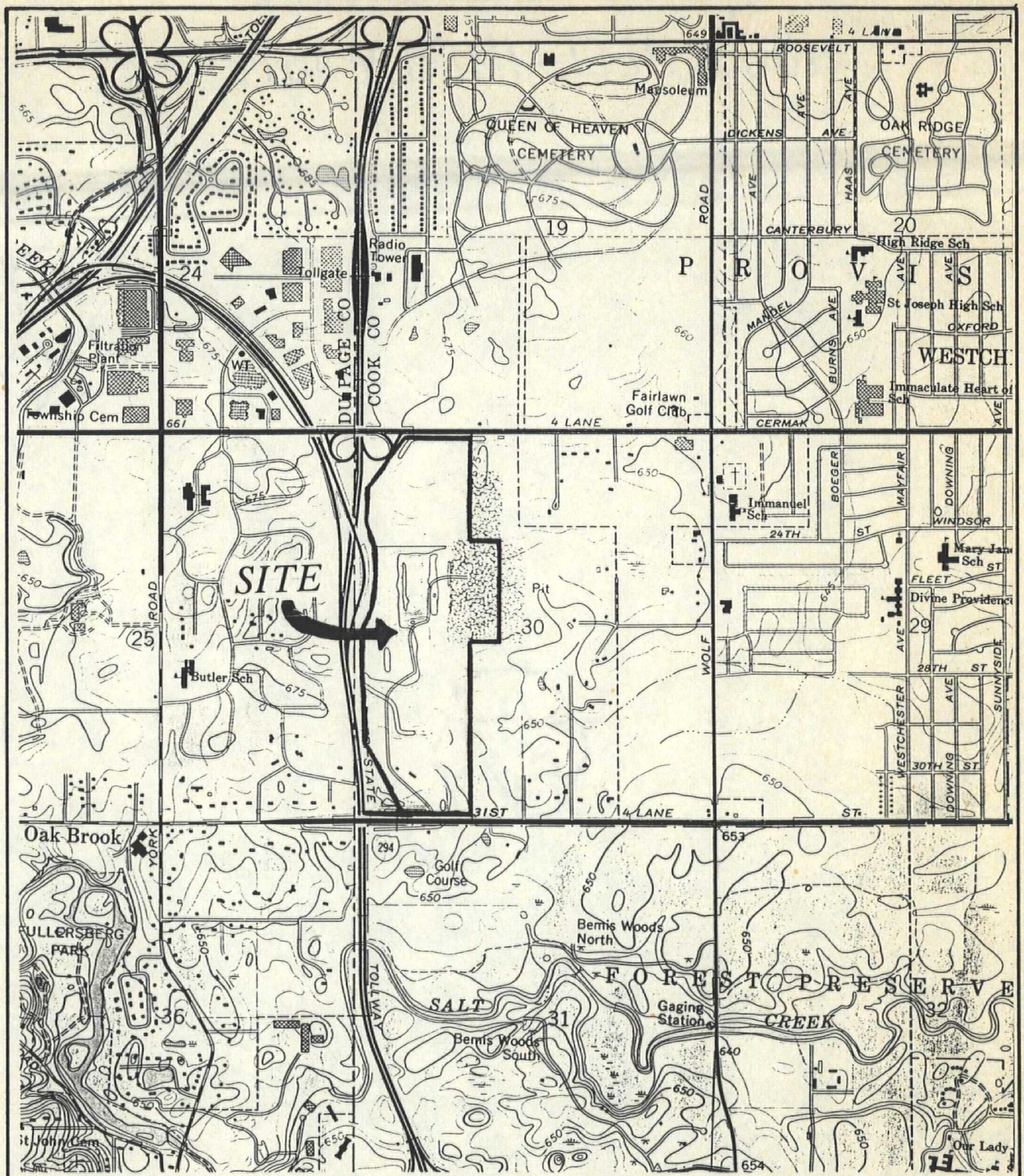
2.2 GEOGRAPHY/PHYSIOGRAPHY

The Hinsdale-Sexton Landfill is located within a large residential area which borders the landfill to the east, west, and north (see Figure 2-1). The site is bordered to the south by the Bemis Woods Forest Preserve. Salt Creek flows west and south of the site. In general, the area topography is characterized by undulating hills of low to little relief with moderate drainage. The landfill itself consists of a relatively high and elongate mound of covered refuse. A pit, observed on a topographic map, is located directly northeast of the landfill. Drainage within the vicinity of the site is directed along unnamed ditches along Cermak Road and I-294 which may eventually reach Salt Creek. An intermittent creek that flows eastward is located east of the site. The landfill slope does not preclude surface runoff.

2.3 GEOLOGY/HYDROGEOLOGY

A review of the current literature indicates the site is underlain by 10 to 100 feet of unconsolidated glacial drift which overlies the Silurian-aged dolomite (Niagaran Formation) (see Appendix A). The site is located over the south bank of a preglacial valley (see Figures 2-2 and 2-3) where the glacial deposits thicken northward toward the valley axis near 24th Street (see Figure 2-2).

The glacial deposits consist of a differentiated sequence of clay, sand, and silt. The uppermost unit consists of a clay till with isolated thin beds of clayey silt to silt and ranges in thickness from 5 to 37 feet (see Figure 2-4). Underlying the clay till is a sand unit (upper glacial aquifer) that is 10 to 20 feet thick. Below the sand unit is a layer of gray silt to clay with thin beds of sand to silty clay. Deposits underlying these units, and trending along the valley axis, are presently unknown. These deposits may represent an aquifer.



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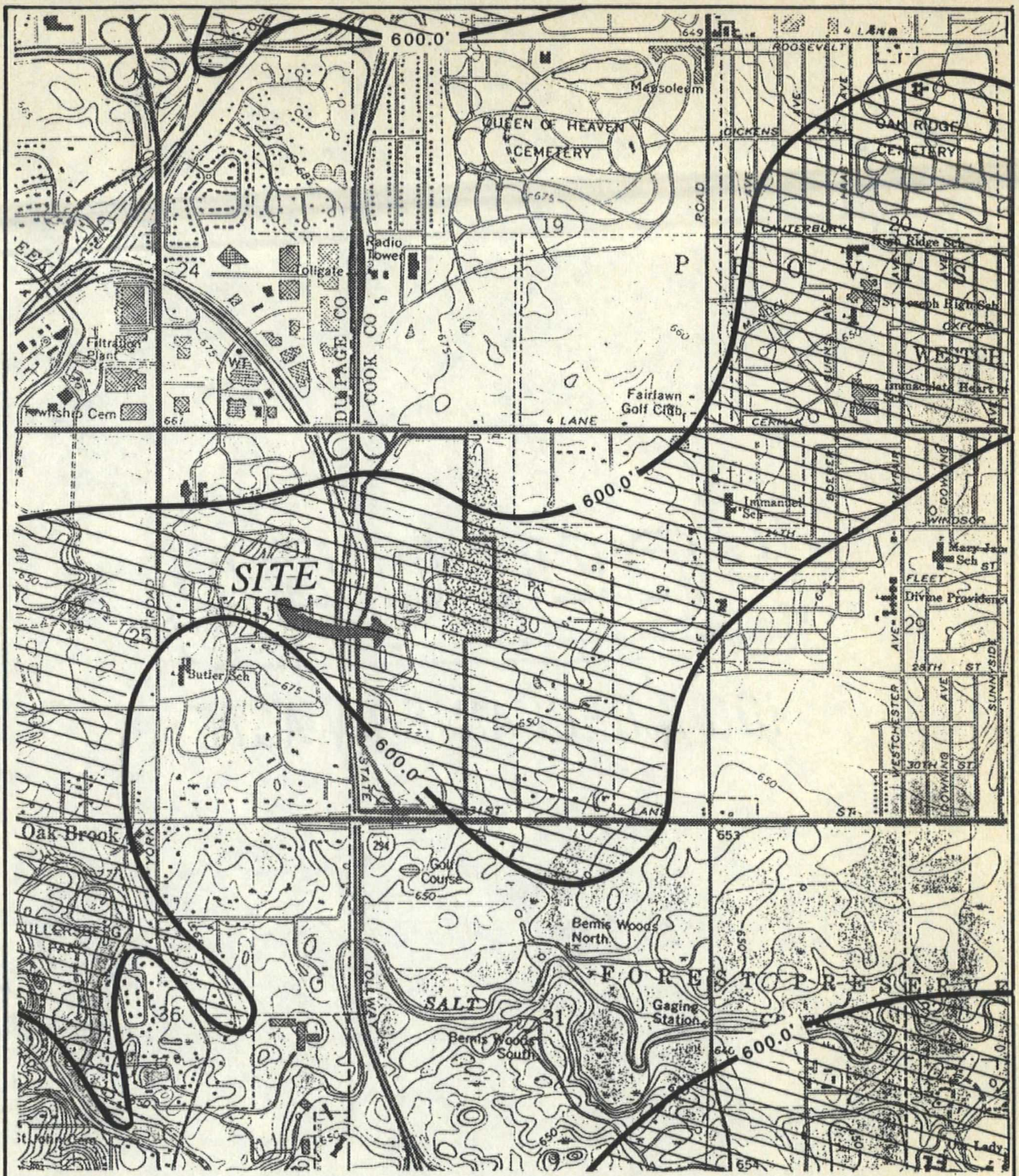
TITLE SITE LOCATION MAP		FIGURE # 2–1
SITE HINSDALE SEXTON LANDFILL		SCALE 1:24,000
CITY OAKBROOK	STATE ILLINOIS	P.A.N. FIL0041G
SOURCE U.S.G.S. QUADRANGLE MAP HINSDALE QUAD.		DATE 1963 REVISED 1980



PRE-GLACIAL VALLEY

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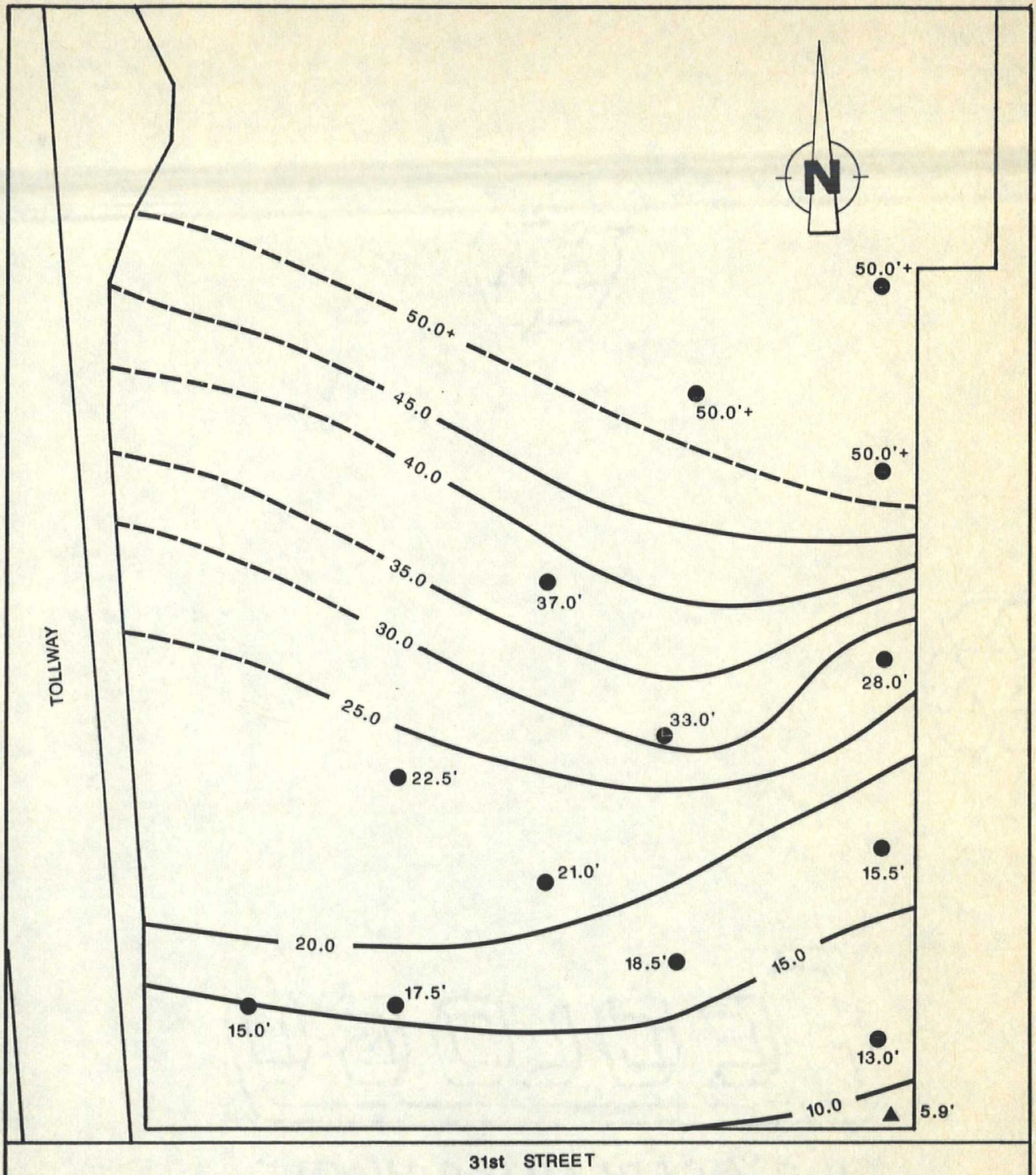
TITLE BEDROCK ELEVATION MAP		FIGURE # 2-2
SITE HINSDALE SEXTON LANDFILL		SCALE 1:24,000
CITY OAKBROOK	STATE ILLINOIS	P.A.N. FIL0041G
SOURCE PISKIN, 1963; I.S.G.S. AND U.S.G.S. QUADRANGLE MAP HINSDALE QUAD.		DATE 1963 REVISED 1980



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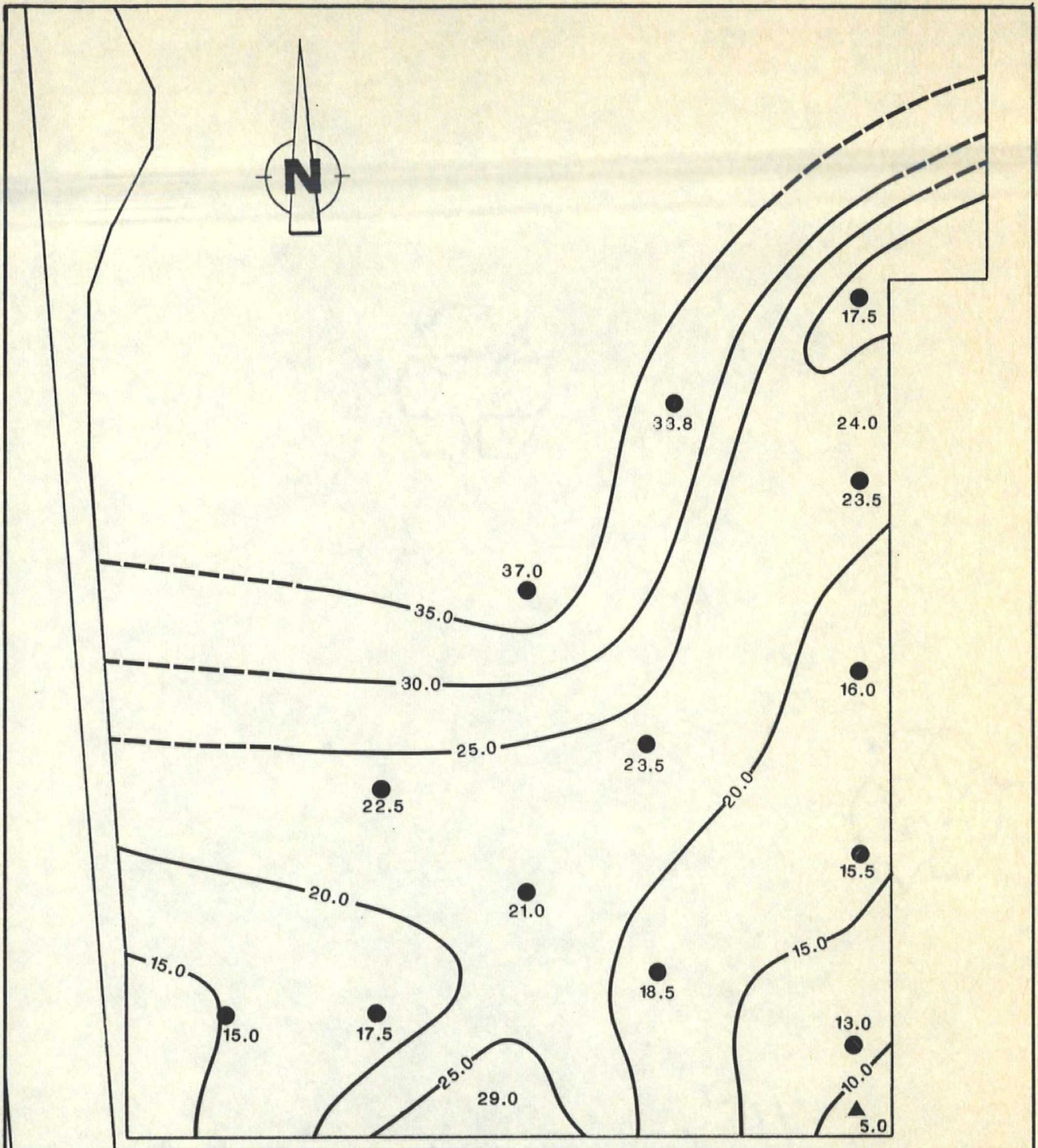
TITLE STRUCTURE CONTOUR OF THE BEDROCK SURFACE	FIGURE # 2-3
SITE HINSDALE SEXTON LANDFILL	SCALE 1" = 400'
CITY OAKBROOK STATE ILLINOIS	P.A.N. FIL0041G
SOURCE ECOLOGY AND ENVIRONMENT, INC AND WALTER H. FLOOD AND CO., INC	DATE REVISED



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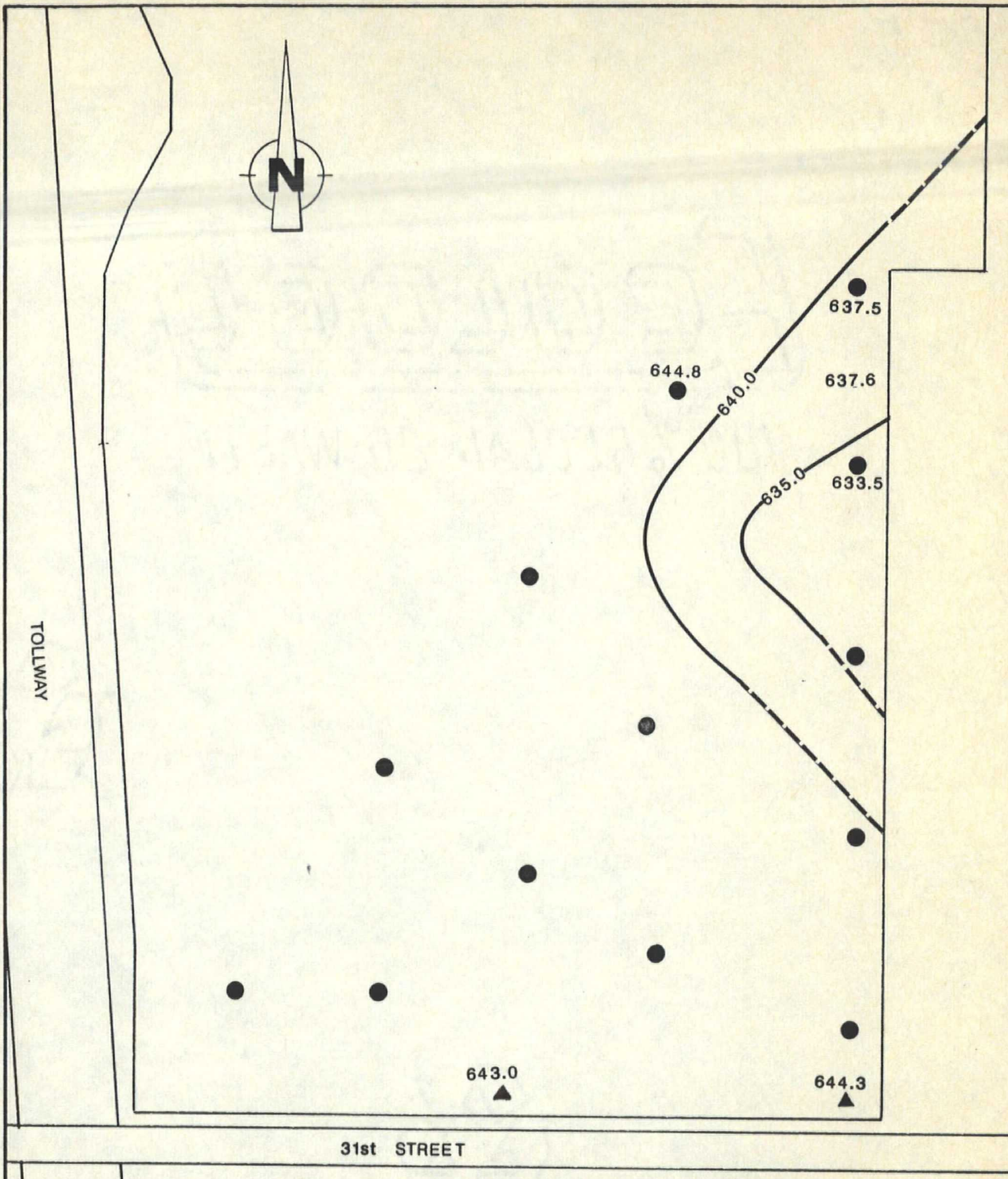
TITLE ISOPACH OF THE CONFINING UNIT	FIGURE # 2-4
SITE HINSDALE SEXTON LANDFILL	SCALE 1" = 400'
CITY OAKBROOK STATE ILLINOIS	P.A.N. FIL0041G
SOURCE ECOLOGY AND ENVIRONMENT, INC AND WALTER H. FLOOD AND CO., INC	DATE REVISED

The presence of this aquifer could be determined by drilling a well at the valley axis.

Based on data collected from 1972 to 1974, groundwater flow in the glacial aquifers is predicted to be easterly (see Figure 2-5). Based on data collected in 1972, flow in the bedrock aquifer is toward the south-southeast (see Figure 2-6). The location and installation of monitoring wells will be based upon these flow directions. An interconnection between the aquifer(s) of concern has been hypothesized, but no substantial quantitative data are available.

Various residential and municipal wells draw water from the Silurian dolomite aquifer. Usage of both bedrock and glacial aquifers is presently unknown. Currently, only the upper glacial aquifer is monitored at the site.



LEGEND

● SOIL BORING

▲ WELL

—— CONTOUR LINE (DASHED WHERE INFERRED)

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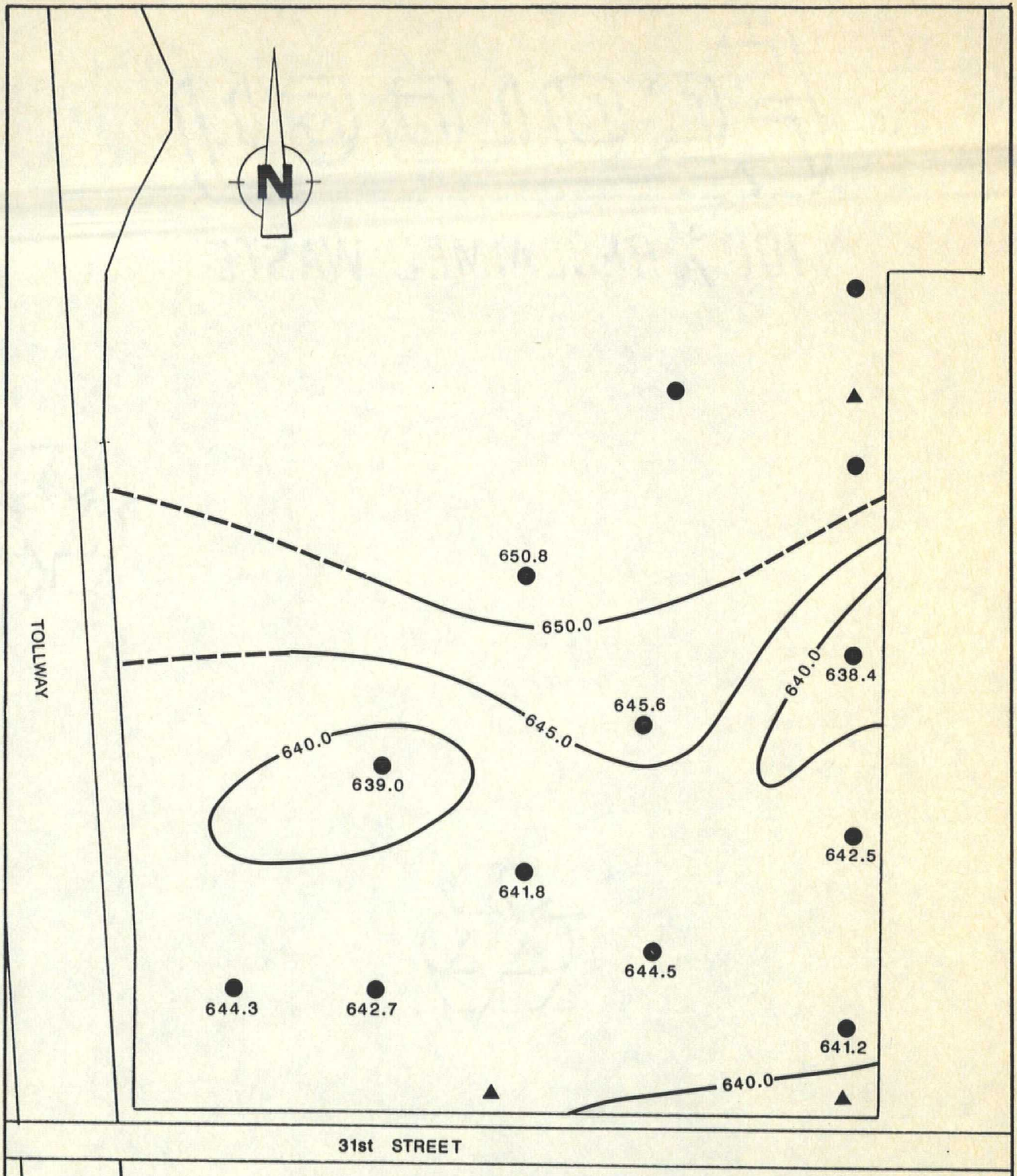
TITLE WATER LEVEL OF THE GLACIAL DRIFT AQUIFER 1972-1974	FIGURE # 2-5
SITE HINSDALE SEXTON LANDFILL	SCALE 1" = 400'
CITY OAKBROOK STATE ILLINOIS	P.A.N. FIL0041G
SOURCE ECOLOGY AND ENVIRONMENT, INC AND WALTER H. FLOOD AND CO., INC	DATE
	REVISED



LEGEND

● SOIL BORING

▲ WELL

—— CONTOUR LINE (DASHED WHERE INFERRED)

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TITLE WATER DEPTH OF THE SILURIAN DOLOMITE AQUIFER 1972	FIGURE # 2-6
SITE HINSDALE SEXTON LANDFILL	SCALE 1" = 400'
CITY OAKBROOK STATE ILLINOIS	P.A.N. FIL0041G
SOURCE ECOLOGY AND ENVIRONMENT, INC AND WALTER H. FLOOD AND CO., INC	DATE
	REVISED

3. PROCEDURES

3.1 INTRODUCTION

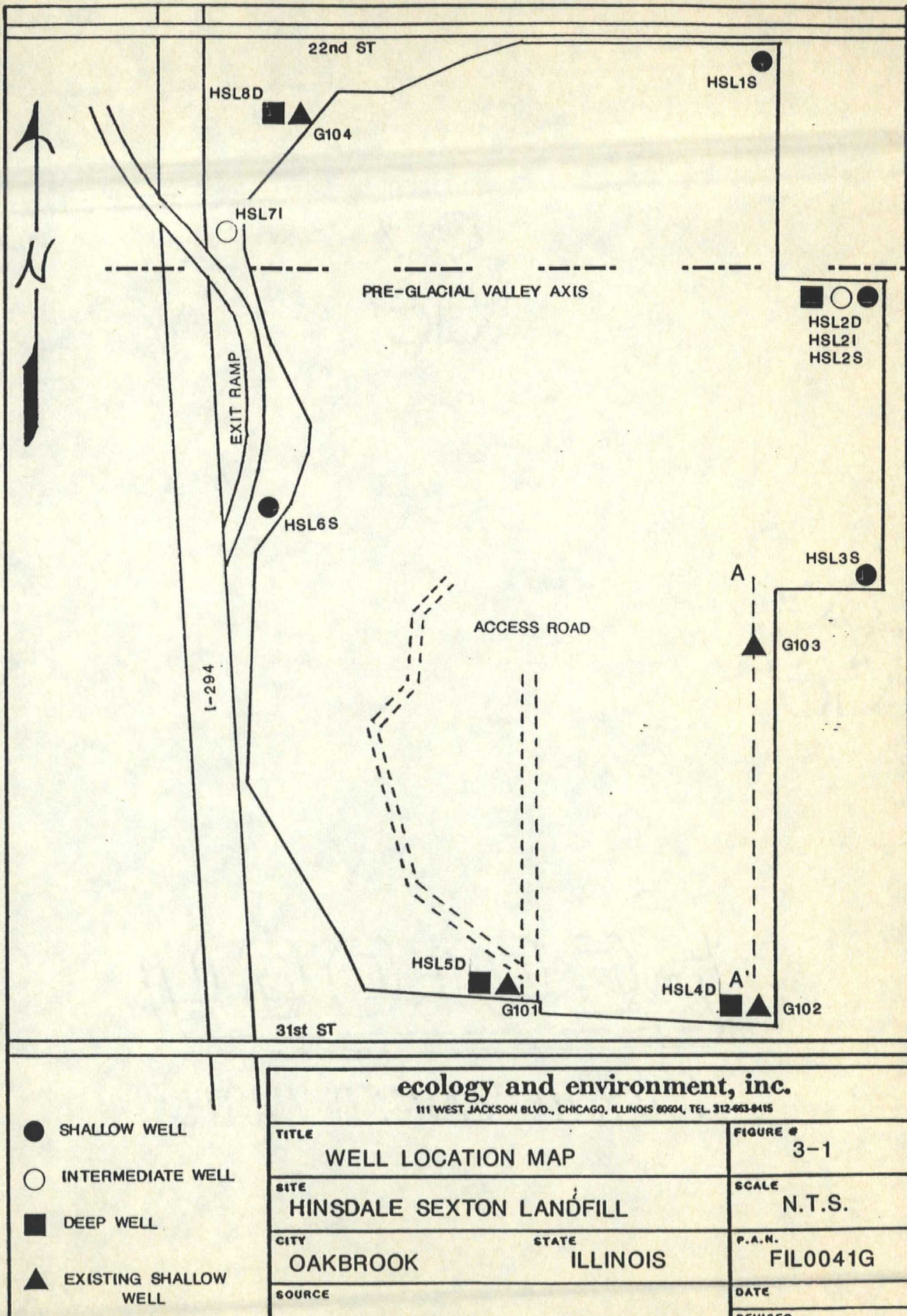
The installation of eight to ten monitoring wells is proposed for the Hinsdale-Sexton Landfill. Ten wells will be installed if an intermediate aquifer is present along the bedrock valley axis. A series of shallow, intermediate, and deep wells will be installed at the respective aquifer depths (see Figures 3-1 and 3-2). Subsurface samples will be sampled at designated intervals. After well completion, all wells will be developed, surveyed, and sampled according to quality assurance/quality control (QA/QC) guidelines. A surface water sampling program will be conducted along surface drainage pathways. Surface soil sampling will also be conducted along these drainage routes. Finally, a pump test is proposed to determine and document the alleged hydraulic connection between aquifers.

3.2 HYDROGEOLOGIC INVESTIGATION

3.2.1 Geophysical Investigation

A preliminary geophysical survey of the eastern portion of the site will be conducted prior to drilling in order to locate the bedrock valley axis. The location and placement of wells HSL2S, HSL2I, HSL2D, and HSL7I will depend upon the results obtained from this survey.

Two overlapping series of transects will be conducted along the east side of the landfill (see Figure 3-3) using a combination of resistivity and seismic survey methods. One continuous series consisting of widely spaced geophones placed along the transect line will be used



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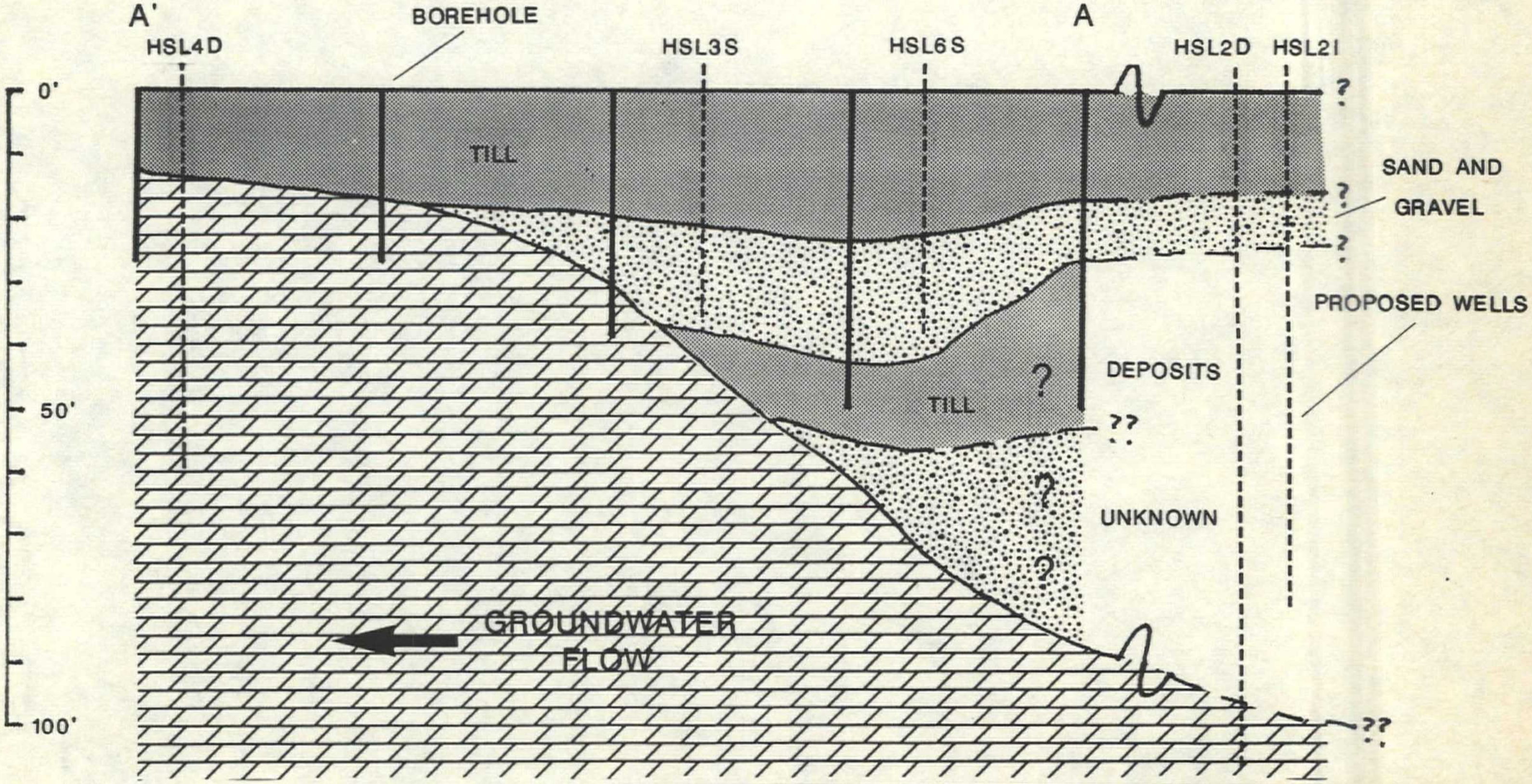
TITLE WELL LOCATION MAP	FIGURE # 3-1
SITE HINSDALE SEXTON LANDFILL	SCALE N.T.S.
CITY OAKBROOK — STATE ILLINOIS	P.A.N. FIL0041G
SOURCE	DATE
	REVISED



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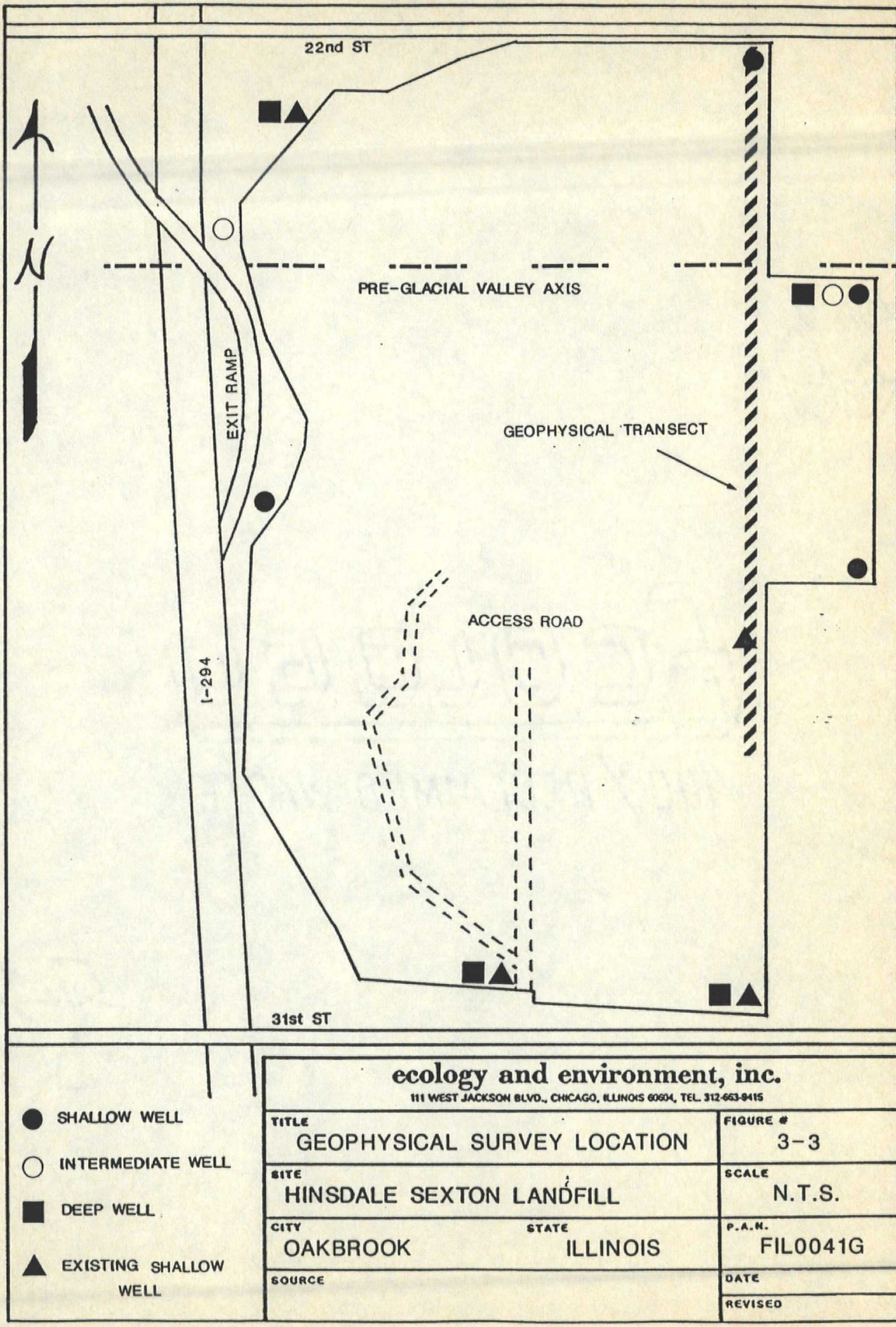
TITLE GEOLOGIC CROSS-SECTION A to A'	FIGURE # 3-2
SITE HINSDALE SEXTON LANDFILL	SCALE N.T.S.
CITY OAKBROOK STATE ILLINOIS	P.A.N. FIL0041G
SOURCE	DATE
	REVISED



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TITLE: GEOPHYSICAL SURVEY LOCATION
FIGURE #: 3-3
SITE: HINSDALE SEXTON LANDFILL
SCALE: N.T.S.
CITY: OAKBROOK
STATE: ILLINOIS
P.A.N.: FIL0041G
SOURCE:
DATE:
REVISED:

to define all the stratigraphic boundaries to the bedrock surface. A series of four short discontinous transects consisting of closely spaced geophones along the same transect line will be used to increase the resolution of the bedrock valley and overlying stratigraphic units. The length of both transects will overlap the proposed locations for wells HSL2S, HSL2I, and HSL2D (see Figure 3-1) to correlate geophysical results with existing stratigraphic data from well G103.

A transect along the west side of the landfill will be considered, but traffic along I-294 may interfere with data retrieval.

3.2.2 Monitoring Well Installation

3.2.2.1 Borehole Placement and Sampling

Eight to ten boreholes/wells will be installed to monitor the glacial and bedrock aquifers. Ten wells will be installed if the preglacial valley axis is located and only if a basal valley-fill aquifer is present. Based upon this situation, four shallow, two intermediate, and four deep boreholes/wells will be installed at the site (see Figure 3-1).

Split spoon samples will be collected during borehole advancement at designated intervals in order to log and characterize the subsurface geology. All samples will be continuously screened for contaminants with an organic vapor analyzer (OVA) and shipped to a Contract Laboratory Program (CLP) laboratory for chemical analysis.

Two sampling schemes will be implemented. The first will be used to sample the uppermost till unit in order to characterize the extent, if any, of possible contaminant migration. Continuous sampling will be conducted over a 10-foot interval, followed by sampling at 2.5-foot intervals for another 10 feet, and sampling at 5.0-foot intervals until the shallow aquifer or bedrock is encountered. A minimum of 10 soil samples will be collected for subsurface chemical analysis at each borehole location. The second scheme will be used during borehole advancement to collect samples to characterize the subsurface stratigraphy. Samples will be collected at 5.0-foot intervals below the upper till unit. Samples not collected for chemical analysis will be further analyzed for logging purposes. Eight Shelby tube samples will be collected from the shallow till unit encountered during drilling. Three more samples will be collected from the deeper till unit. All Shelby tube samples will be analyzed for grain size and permeability.

3.2.2.2 Monitoring Well Construction

The shallow wells will be placed in the upper sand aquifer (see Figure 3-2) with one upgradient (HSL6s) and three downgradient (HSL1S, -2S,-3S) wells. The shallow wells will be drilled, precluding the presence of cobbles and boulders, with an 8-inch continuous flight, hollow-stem auger. Well materials will consist of 2-inch inside diameter (ID) stainless steel riser pipe with threaded flush joints and 10-foot-long screens of manufactured continuous wire-wound design with a screen size of 0.01 inches. The well screens will be placed at a depth of 5 feet below the upper till unit. The depth of each shallow well will vary according to the depth of the upper sand unit (see Figure 3-2). The locations of the shallow wells are subject to change, depending upon the present groundwater flow direction.

The intermediate wells will be placed at a depth within the lower sand aquifer (if present) along the bedrock valley axis (see Figure 3-2). There will be one upgradient well (HSL7I) and one downgradient well (HSL2I) (see Figure 3-1). Well construction materials are similar to those listed above, however, additional materials will be needed to prevent cross-contamination of the upper and lower (if present) glacial aquifers prior to final well installation. The 10-inch boreholes will be cased with 6 5/8-inch outside diameter (OD) steel casing with threaded joints to the base of the upper sand unit. The casing will be driven a minimum of 1 foot into the underlying till member. At this point, the outer casing annulus will be grouted and allowed to set for at least 24 hours. Boreholes will be advanced with a 5-inch bit until a lower glacial aquifer is encountered. The intermediate wells will be drilled using the rotary mud method.

The deep (bedrock) wells (see Figure 3-1) will be placed at a depth of no less than 50 and no greater than 130 feet (see Figure 3-2). One upgradient (HSL8D) and two downgradient (HSL4D and HSL5D) wells will be installed. A fourth deep well (HSL2D) will be located along the valley axis. Wells HSL4D and HSL5D will be placed at a depth no more than 30 feet below the base of the upper sand unit. Wells HSL2D and HSL8D will be placed at a depth no greater than 20 feet below the bedrock surface. All deep wells will be drilled using a combination of rotary-mud (overburden) and combination coring/rotary-mud (bedrock) because of the thick glacial overburden. Well construction materials for final well installation will be similar to those discussed above.

In order to prevent the potential of cross-contamination between aquifers during drilling of the wells HSL2D and HSL8D, the boreholes drilled to the bedrock aquifer will be double-cased. The 10-inch borehole will be cased with 8 5/8-inch OD steel casing with threaded joints to the base of the upper sand unit. The casing will be driven a minimum of 1 foot into the lower till unit where the outer annulus will be grouted and allowed to set. The borehole will be advanced with an 8 1/2-inch bit to a minimum of 1 foot into the bedrock surface. Next, the 8 1/2-inch borehole will be cased with 6 5/8-inch OD steel casing with threaded joints into the bedrock surface. The middle annulus will be grouted and allowed to set accordingly. The remainder of the 6-inch borehole will be cored with a NQ core barrel and reamed with a 6-inch bit to well completion.

Prior to coring HSL4D and HSL5D, the clay overburden will be drilled to bedrock with a hollow-stem auger until nonfractured bedrock is reached. Permanent steel casing (6 5/8-inch OD) will be anchored into bedrock and the outer annulus grouted accordingly. HSL4D and HSL5D will then be cored from the top of the bedrock to final depth, using an NQ wire-line barrel. The boreholes will then be reamed with a 6-inch bit until well completion. Depending upon the fracture density of the bedrock and resulting grout loss, the borehole may have to be cased prior to riser pipe installation. All core samples will be marked indicating location and depths, and packaged and studied in detail at a later time.

The remaining annular space for each well will be filled using the following materials, starting from the bottom:

1) Clean 3/8-inch diameter gravel covering the screen and extending 3 feet above the top of the screen.

2) Clean fine-grained sand placed to a minimum of 1 foot above the gravel pack.

3) Volclay grout placed through tremie pipe from the top of the fine sand seal to the ground surface.

The 2-inch OD stainless steel riser pipe will have a 2.5-foot stick-up ending in threads and will be covered with a 5-foot-long, 5-inch ID, protective steel casing with locking cap. A concrete plug and pad which slopes away from the steel casing will also be installed. Concrete-filled steel bumper guards, 4-inch ID, will be installed as needed.

3.3 AQUIFER TESTING

3.3.1 Physical Testing

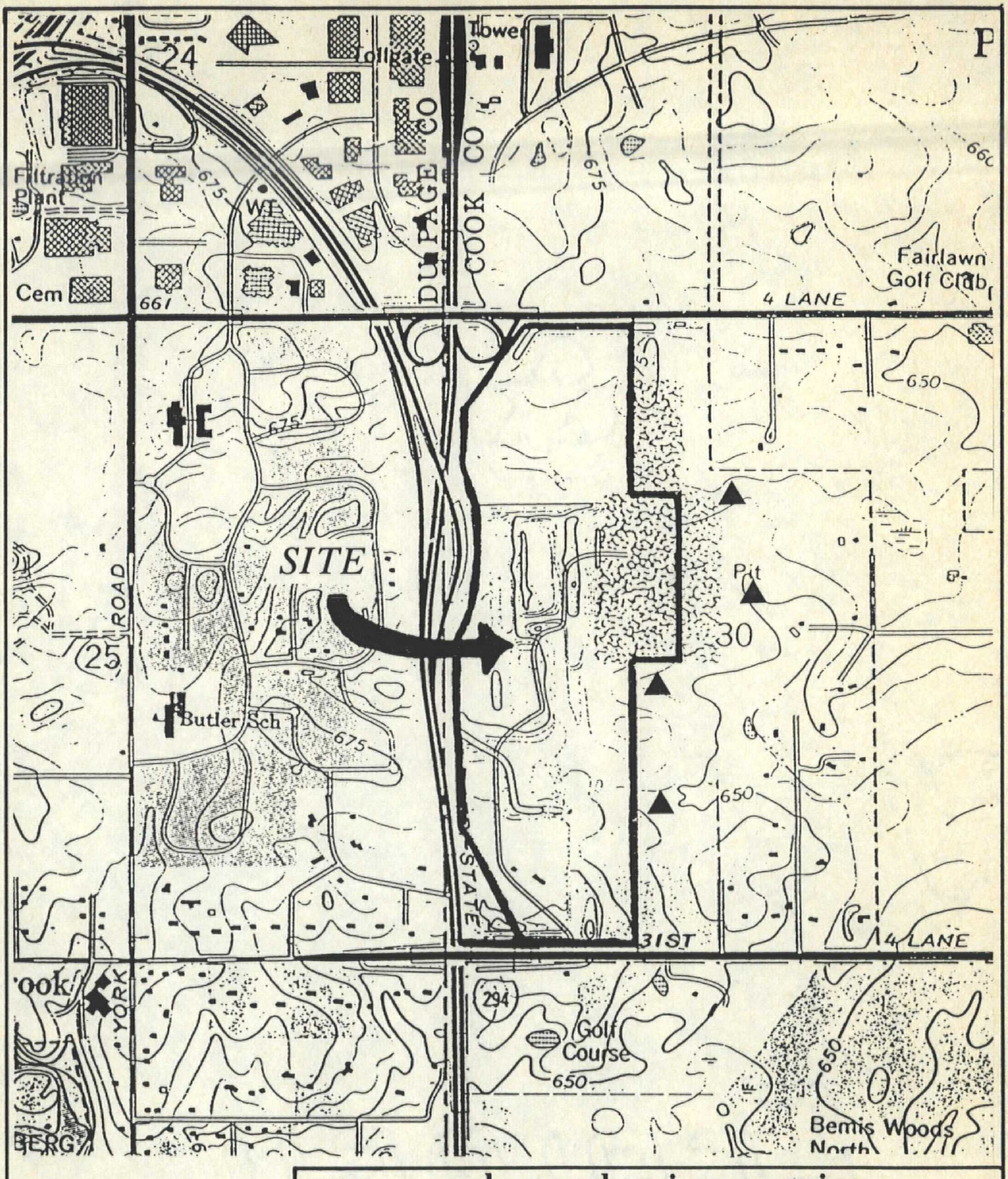
Water elevations will be recorded for each monitoring well and used to calculate groundwater flow direction and gradient. Rising head slug tests will also be performed to assess additional physical characteristics of the aquifer.

3.3.2 Chemical Testing

Upon completion and development of all of the proposed wells, groundwater samples from each well will be collected and sent to designated CLP laboratories for analysis. The samples will be analyzed for organic and inorganic target compounds.

3.4 SURFACE SOIL/SEDIMENT SAMPLING

Four to six surficial soil and sediment samples will be collected on and around the site, primarily along surface runoff paths (see Figure 3-4). The locations and number of samples will be subject to change depending upon site observations during the project. These samples will be shipped to CLP laboratories for chemical analysis. The samples will be analyzed for organic and inorganic target compounds and will be used to characterize contaminants that may be originating from the site.



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TITLE PROPOSED SOIL SAMPLE LOCATION MAP		FIGURE # 3-4
SITE HINSDALE SEXTON LANDFILL		SCALE 1:1200
CITY OAKBROOK	STATE ILLINOIS	P.A.N. FIL0041G
SOURCE U.S.G.S. QUADRANGLE MAP HINSDALE QUAD.		DATE 1963 REVISED 1980

3.5 SURFACE WATER SAMPLING

Four to six upstream and downstream water samples will be collected along the unnamed ditches bordering the site and at the intermittent tributary, if applicable, of Salt Creek. The locations and number of samples will also be subject to change as mentioned above. These samples will be shipped to the CLP laboratories for chemical analysis. The samples will be analyzed for organic and inorganic target compounds.

APPENDIX A

BORING LOGS

BEdRock

FOR:	Sexton Filling & Grading Corporation
PROJECT:	12100 West. 31st Street
LOCATION	Westchester, Illinois

SOIL BORING LOG NO. 1

WALTER H. FLOOD & CO., INC.

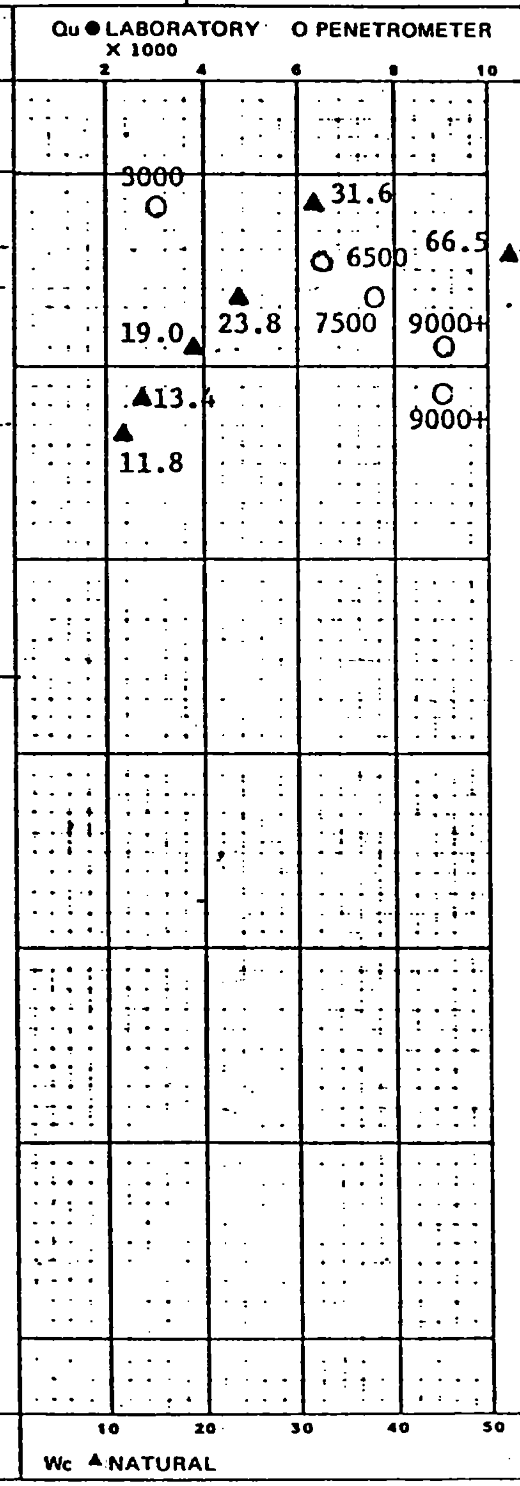
• Engineers •

• CHICAGO • KALAMAZOO •

METHOD OF BORING:	A & C	WATER LEVEL READINGS	
SPLIT SPOON SIZE:	2 IN.	Dry	W.D.
WT. OF HAMMER	140 LBS.		B.C.R.
INCH DROP	30	8.0'	A.C.R.
SHELBY TUBE SIZE		9.2'@24	HRS. AFTER DRILLING
CASING USED	15'-24" IDHS		HRS. AFTER DRILLING

DATE OF BORING:	3-7-72 3-8-72	BY:	BJ,JC,MC:bc
JOB NO.:	7205-0010	VERTICAL SCALE:	1"=10'

ELEV.	DEPTH	S	T	N	LR	DD	DESCRIPTION
650.4	0.0						Ground surface Brown&black clay, fill
		1	ss	8			
646.9	3.5	2	ss	12			Black clay, very tough
640.9	6.0	3	ss	16			Brown to gray clay, trace of small gravel, very tough to hard
		4	ss	40			
		5	ss	50/4"			
		6	ss	100/1"			
637.4	13.0	7	ss	100/1"			Brownish-gray dolomite, weathered, fractured, dense
		8	C				
		9	C				
624.4	26.0						End of boring



LEGEND: DEPTH—FEET BELOW GROUND SURFACE
S —SAMPLE NUMBER
T —TYPE OF SAMPLE
N —PENETRATION, BLOWS PER FOOT
L —SAMPLE LENGTH
R —LENGTH OF SAMPLE RECOVERED
DD —DRY DENSITY, LB. PER CU. FOOT

WO —WASHOUT
A —AUGER
HS —HOLLOW STEM AUGER
SS —SPLIT SPOON
ST —SHELBY TUBE
FT —FISH TAIL
C —CORE
Wc —WATER CONTENT PERCENT

BCR—BEFORE CASING REMOVAL
ACR—AFTER CASING REMOVAL
WD —WHILE DRILLING
WCI —WET CAVE IN
DCI —DRY CAVE IN
Qu —UNCONFINED COMPRESSIVE STRENGTH POUNDS PER SQUARE FOOT

BEDROCK

FOR:	Sexton Filling & Grading Corporation
PROJECT:	12100 West 31st Street
LOCATION	Westchester, Illinois

SOIL BORING LOG NO. 2

WALTER H. FLOOD & CO., INC.

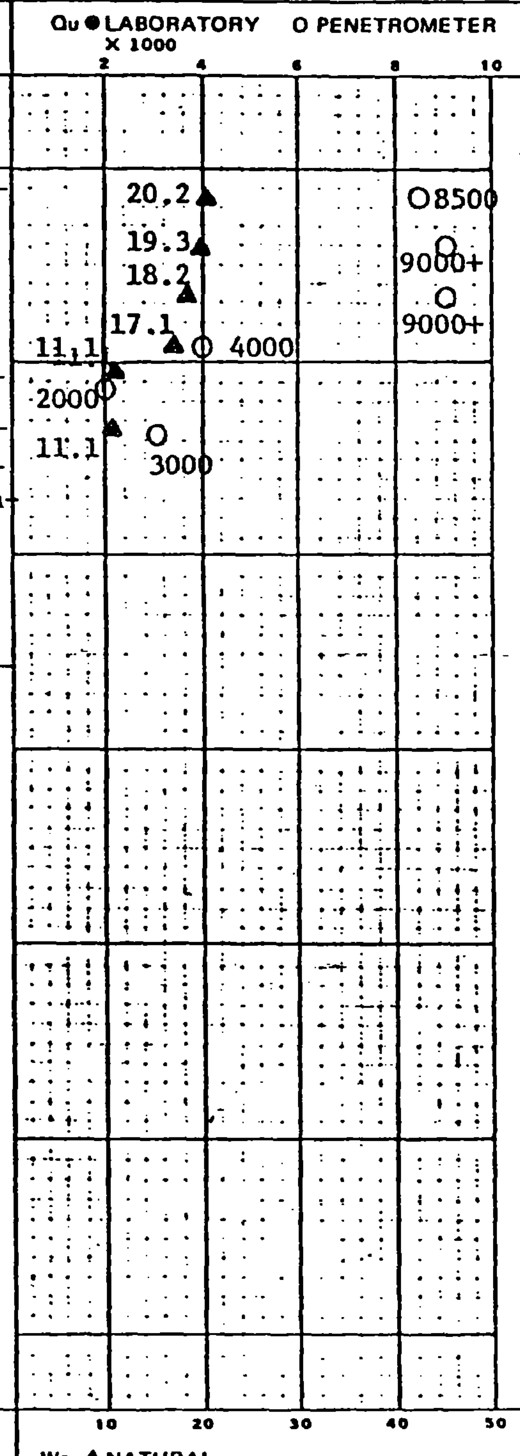
• Engineers •

• CHICAGO • KALAMAZOO •

METHOD OF BORING:	A & C	WATER LEVEL READINGS	
SPLIT SPOON SIZE:	2 IN.	Dry	W.D.
WT. OF HAMMER	140 LBS.		B.C.R.
INCH DROP	30	12.6'	A.C.R.
SHELBY TUBE SIZE		10.5'@24	HRS. AFTER DRILLING
CASING USED	15'-2¼" IDHS		HRS. AFTER DRILLING

DATE OF BORING:	3-9-72 3-10-72	BY:	BJ,CN,JC:bc
JOB NO.:	7205-0010	VERTICAL SCALE:	1"=10'

ELEV.	DEPTH	S	T	N	L	R	DD	DESCRIPTION
								Ground surface
653.0	0.0							Black clay loam
652.0	1.0	1	ss	26				Brown and gray clay, trace of small gravel, hard
		2	ss	28				
		3	ss	34				
		4	ss	20				
642.0	11.0	5	ss	27				Gray clayey silt, medium dense
639.5	13.5	6	ss	150				See note
637.5	15.5	7	C					Brown to gray dolomite, thinly bedded, fractured, dense
626.5	26.5							End of boring
								Note: Gray clayey silt, some small to large gravel, stone fragments, dense



LEGEND: DEPTH—FEET BELOW GROUND SURFACE
S —SAMPLE NUMBER
T —TYPE OF SAMPLE
N —PENETRATION, BLOWS PER FOOT
L —SAMPLE LENGTH
R —LENGTH OF SAMPLE RECOVERED
DD —DRY DENSITY, LB. PER CU. FOOT

WO —WASHOUT
A —AUGER
HS —HOLLOW STEM AUGER
SS —SPLIT SPOON
ST —SHELBY TUBE
FT —FISH TAIL
C —CORE

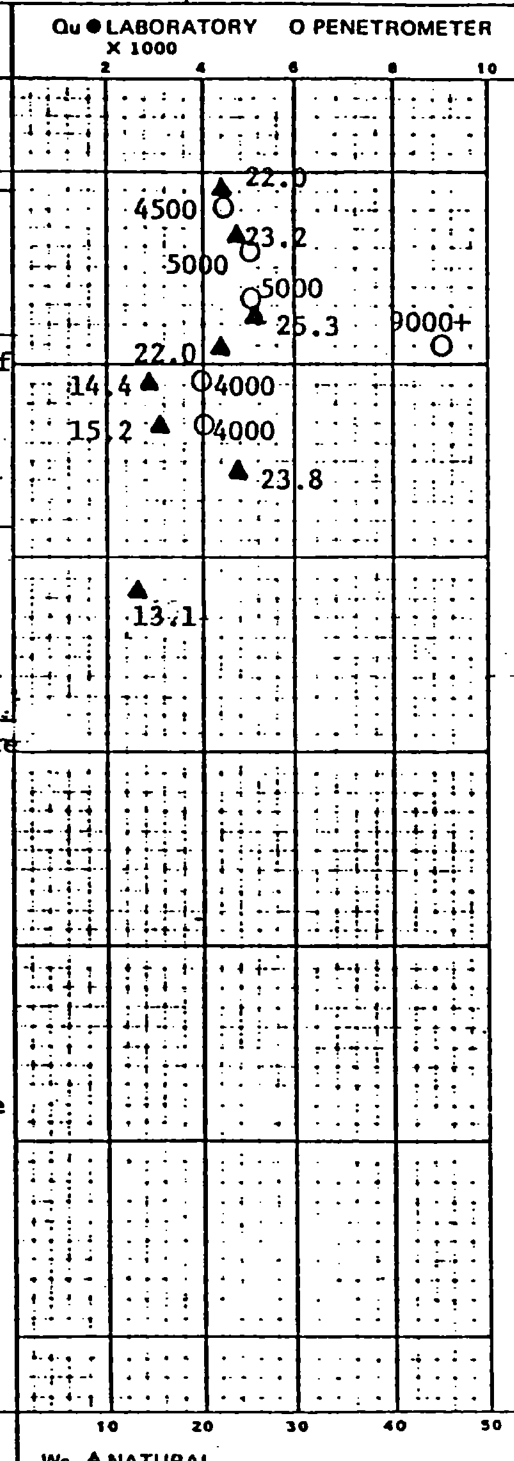
BCR—BEFORE CASING REMOVAL
ACR—AFTER CASING REMOVAL
WD —WHILE DRILLING
WCI —WET CAVE IN
DCI —DRY CAVE IN
Qu —UNCONFINED COMPRESSIVE STRENGTH POUNDS PER SQUARE FOOT

BEDROCK

FOR: Sexton Filling & Grading Corporation	SOIL BORING LOG NO. 3
PROJECT: 12100 West 31st Street	WALTER H. FLOOD & CO., INC. • Engineers •
LOCATION Westchester, Illinois	• CHICAGO • KALAMAZOO •

METHOD OF BORING: A	WATER LEVEL READINGS	DATE OF BORING: 3-9-72	BY: CN&JC:bc
SPLIT SPOON SIZE: 2 IN.	17.0' W.D.	JOB NO.: 7205-0010	VERTICAL SCALE: 1"=10'
WT. OF HAMMER 140 LBS.	B.C.R.		
INCH DROP 30	11.0' A.C.R.		
SHELBY TUBE SIZE	10.0' @24 HRS. AFTER DRILLING		
CASING USED 30'-2¼" IDHS	HRS. AFTER DRILLING		

ELEV.	DEPTH	S	T	N	L	R	DD	DESCRIPTION
648.4	0.0							Ground surface
647.4	1.0							Black clay loam
		1	ss	16				Brown and gray clay, very tough
		2	ss	8				
		3	ss	9				
639.9	8.5							
		4	ss	23				Brown and gray clay, trace of small gravel, hard to very tough
		5	ss	18				
		6	ss	20				
632.4	16.0							
		7	ss	24				Gray fine to medium sand, some silt, medium dense
629.9	18.5							
		8	ss	27				Gray fine sand and silt, medium dense
		9	ss	19				
		10	ss	16				
622.4	26.0							
		11	ss	22				See note
620.4	28.0							
		12	ss	100/1.5				Light gray and brown dolomite thinly bedded, very dense
		13	C					
		14	C					
610.4	38.0							
								End of boring
								Note; Gray silt, some small to large gravel, stone fragments, very dense



LEGEND:
DEPTH—FEET BELOW GROUND SURFACE
S —SAMPLE NUMBER
T —TYPE OF SAMPLE
N —PENETRATION, BLOWS PER FOOT
L —SAMPLE LENGTH
R —LENGTH OF SAMPLE RECOVERED
DD —DRY DENSITY, LB. PER CU. FOOT

WO —WASHOUT
A —AUGER
HS —HOLLOW STEM AUGER
SS —SPLIT SPOON
ST —SHELBY TUBE
FT —FISH TAIL
C —CORE
Wc —WATER CONTENT PERCENT

BCR—BEFORE CASING REMOVAL
ACR—AFTER CASING REMOVAL
WD —WHILE DRILLING
WCI —WET CAVE IN
DCI —DRY CAVE IN
Qu —UNCONFINED COMPRESSIVE STRENGTH POUNDS PER SQUARE FOOT

FOR:	Sexton Filling & Grading Corporation
PROJECT:	12100 West 31st Street
LOCATION	Westchester, Illinois

SOIL BORING LOG NO. 4

WALTER H. FLOOD & CO., INC.

• Engineers •

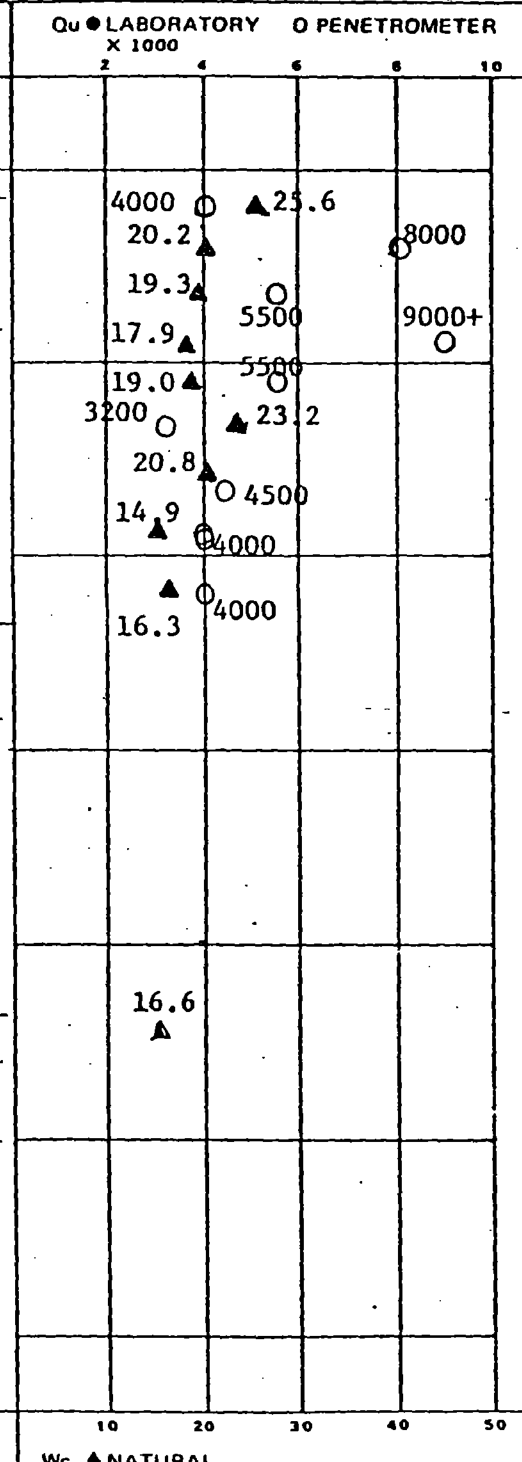
• CHICAGO • KALAMAZOO •

METHOD OF BORING:	HS	
SPLIT SPOON SIZE:	2	IN.
WT. OF HAMMER	140	LBS.
INCH DROP	30	
SHELBY TUBE SIZE		
CASING USED	50'-2¼" IDHS	

WATER LEVEL READINGS	
18.5'	W.D.
18.0'	B.C.R.
17.0'	A.C.R.
16.7'@24	HRS. AFTER DRILLING
	HRS. AFTER DRILLING

DATE OF BORING:	3-16-72	BY:	BJ&JA:bc
JOB NO.:	7205-0010	VERTICAL SCALE:	1"=10'

ELEV.	DEPTH	S	T	N	L R	DD	DESCRIPTION
							Ground surface
650.2	0.0						Black clay loam
648.7	1.5	1	ss	10			Brown and gray clay, very tough
		2	ss	13			
		3	ss	15			
641.7	8.5	4	ss	28			Brown to gray clay, trace of small gravel, hard to very tough
		5	ss	19			
		6	ss	12			
		7	ss	14			
		8	ss	14			
		9	ss	11			
626.7	23.5	10	ss	21			Gray medium sand, trace of silt, medium dense
		11	ss	32			
621.7	28.5	12	ss	48			Gray fine sand, some silt, dense
		13	ss	25			
		14	ss	31			
		15	ss	26			
		16	ss	18			
		17	ss	20			
606.7	43.5	18	ss	53			Gray silt, some fine to coarse sand with small to large gravel, occasional boulder, very dense
		19	ss	53			
		20	ss	67			
600.2	50.0						End of boring
ELEV.	DEPTH	S	T	N	L R	DD	DESCRIPTION



LEGEND:
DEPTH — FEET BELOW GROUND SURFACE
S — SAMPLE NUMBER
T — TYPE OF SAMPLE
N — PENETRATION, BLOWS PER FOOT
L — SAMPLE LENGTH
R — LENGTH OF SAMPLE RECOVERED
DD — DRY DENSITY, LB. PER CU. FOOT

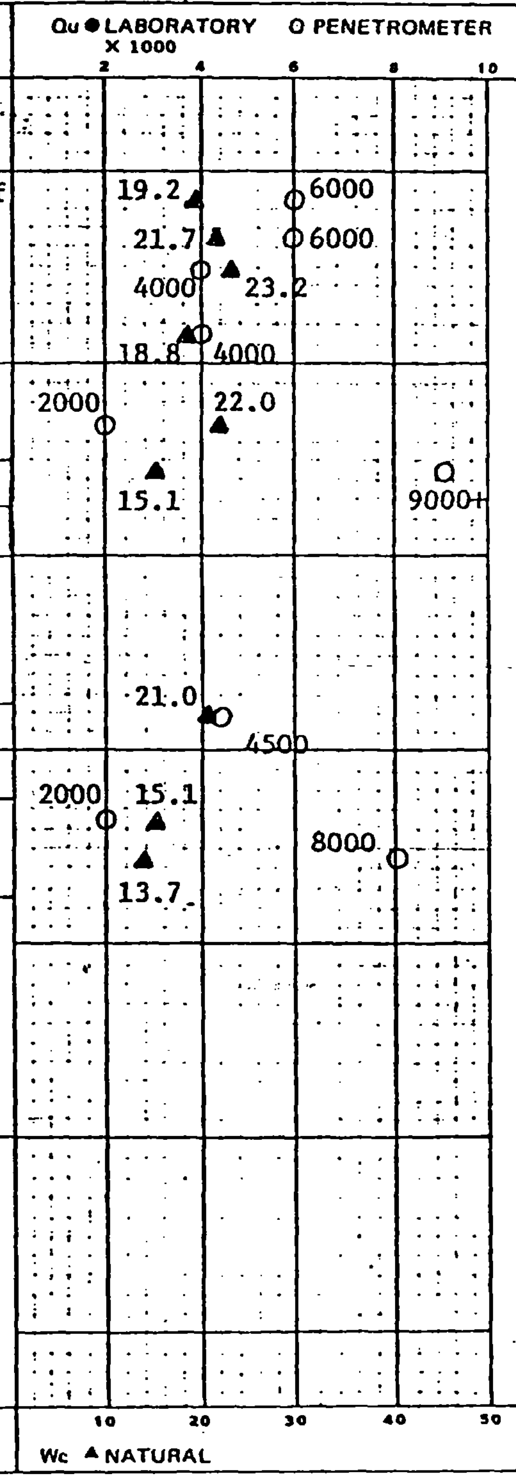
WO — WASHOUT
A — AUGER
HS — HOLLOW STEM AUGER
SS — SPLIT SPOON
ST — SHELBY TUBE
FT — FISH TAIL
C — CORE
Wc — WATER CONTENT PERCENT

BCR — BEFORE CASING REMOVAL
ACR — AFTER CASING REMOVAL
WD — WHILE DRILLING
WCI — WET CAVE IN
DCI — DRY CAVE IN
Qu — UNCONFINED COMPRESSIVE STRENGTH POUNDS PER SQUARE FOOT

FOR: Sexton Filling & Grading Corporation	SOIL BORING LOG NO. 5
PROJECT: 12100 West 31st Street	WALTER H. FLOOD & CO., INC. • Engineers • • CHICAGO • KALAMAZOO •
LOCATION Westchester, Illinois	

METHOD OF BORING: HS	WATER LEVEL READINGS	DATE OF BORING: 5-8-72	BY: DL&BS:bc
SPLIT SPOON SIZE: 2 IN.	15.0' W.D.	JOB NO.: 7205-0010	VERTICAL SCALE: 1"=10'
WT. OF HAMMER 140 LBS.	15.0' B.C.R.		
INCH DROP 30	14.2' A.C.R.		
SHELBY TUBE SIZE	12.1'@24 HRS. AFTER DRILLING		
CASING USED	HRS. AFTER DRILLING		

ELEV.	DEPTH	S	T	N	L	R	DD	DESCRIPTION
649.6	0.0							Ground surface
		1	ss	15				Brown and gray clay, trace of small gravel, very tough
		2	ss	13				
		3	ss	8				
		4	ss	9				
639.6	10.0	5	ss	20				Gray silt, clay and medium sand layers, medium dense
		6	ss	13				
634.6	15.0	7	ss	18				Gray clay, trace of small gravel, hard
632.1	17.5	8	ss	21				Gray medium to coarse sand, some silt, clay, medium dense
629.6	20.0	9	ss	31				Gray fine sand and silt, dense
		10	ss	83				
		11	ss	77				
622.1	27.5	12	ss	13				Gray clay, thin sand layers, very tough
619.6	30.0	13	ss	48				Gray medium sand, trace of silt, dense
617.1	32.5	14	ss	9				Gray silty clay, trace of small gravel, tough to very tough
		15	ss	29				
612.1	37.5	16	ss	34				Gray silt, some fine to coarse sand, small to large gravel, occasional boulder, very dense
		17	ss	101				
		18	ss	61				
		19	ss	125				
		20	ss	104				
		21	ss	145				
599.6	50.0							End of boring
ELEV.	DEPTH	S	T	N	L	R	DD	DESCRIPTION



LEGEND: DEPTH—FEET BELOW GROUND SURFACE
S —SAMPLE NUMBER
T —TYPE OF SAMPLE
N —PENETRATION, BLOWS PER FOOT
L —SAMPLE LENGTH
R —LENGTH OF SAMPLE RECOVERED
DD —DRY DENSITY, LB. PER CU. FOOT

WO —WASHOUT
A —AUGER
HS —HOLLOW STEM AUGER
SS —SPLIT SPOON
ST —SHELBY TUBE
FT —FISH TAIL
C —CORE
Wc —WATER CONTENT PERCENT

BCR—BEFORE CASING REMOVAL
ACR—AFTER CASING REMOVAL
WD —WHILE DRILLING
WCI —WET CAVE IN
DCI —DRY CAVE IN
Qu —UNCONFINED COMPRESSIVE STRENGTH POUNDS PER SQUARE FOOT

Bedlock

6

FOR:	Sexton Filling & Grading Corporation
PROJECT:	12100 West 31st Street
LOCATION	Westchester, Illinois

SOIL BORING LOG NO. 6

WALTER H. FLOOD & CO., INC.

• Engineers •

• CHICAGO • KALAMAZOO •

METHOD OF BORING:	HS	WATER LEVEL READINGS	
SPLIT SPOON SIZE:	2 IN.	Dry	W.D.
WT. OF HAMMER	140 LBS.		B.C.R.
INCH DROP	30	Dry	A.C.R.
SHELBY TUBE SIZE		14.5'@24	HRS. AFTER DRILLING
CASING USED	18'-2¼" IDHS		HRS. AFTER DRILLING

DATE OF BORING:	3-9-72	BY:	BJ&JA:bc
JOB NO.:	7205-0010	VERTICAL SCALE:	1"=10'

ELEV.	DEPTH	S	T	N	L	R	DD	DESCRIPTION	Wc ▲ NATURAL	Qu ● LABORATORY / ○ PENETROMETER (× 1000)
659.0	0.0							Ground surface		
		1	ss	16				Brown and gray clay, trace of small gravel, hard	19.9	9000+
		2	ss	21					19.3	9000+
652.0	7.0	3	ss	42				See note 1	8.0 / 17.4	9000+
650.5	8.5	4	ss	17				Brown to gray clay, trace of small gravel, hard		9000+
		5	ss	22					14.2	9000+
		6	ss	33					11.8	8500
643.0	16.0	7	ss	50/5"				See note 2	9.2	
640.5	18.5	8	C					Light gray and brown dolomite thinly bedded, fractured, very dense		
		9	C							
		10	C							
625.5	33.5							End of boring		

Qu scale: 2, 4, 6, 8, 10. Wc scale: 10, 20, 30, 40, 50.

Note1: Brown silt, trace of clay, dense

Note2: Gray silt, some fine to coarse sand, small to large gravel, stone fragments very dense

LEGEND:

DEPTH – FEET BELOW GROUND SURFACE	WO – WASHOUT	BCR – BEFORE CASING REMOVAL
S – SAMPLE NUMBER	A – AUGER	ACR – AFTER CASING REMOVAL
T – TYPE OF SAMPLE	HS – HOLLOW STEM AUGER	WD – WHILE DRILLING
N – PENETRATION, BLOWS PER FOOT	SS – SPLIT SPOON	WCI – WET CAVE IN
L – SAMPLE LENGTH	ST – SHELBY TUBE	DCI – DRY CAVE IN
R – LENGTH OF SAMPLE RECOVERED	FT – FISH TAIL	Qu – UNCONFINED COMPRESSIVE STRENGTH POUNDS PER SQUARE FOOT
DD – DRY DENSITY, LB. PER CU. FOOT	C – CORE	
	Wc – WATER CONTENT PERCENT	

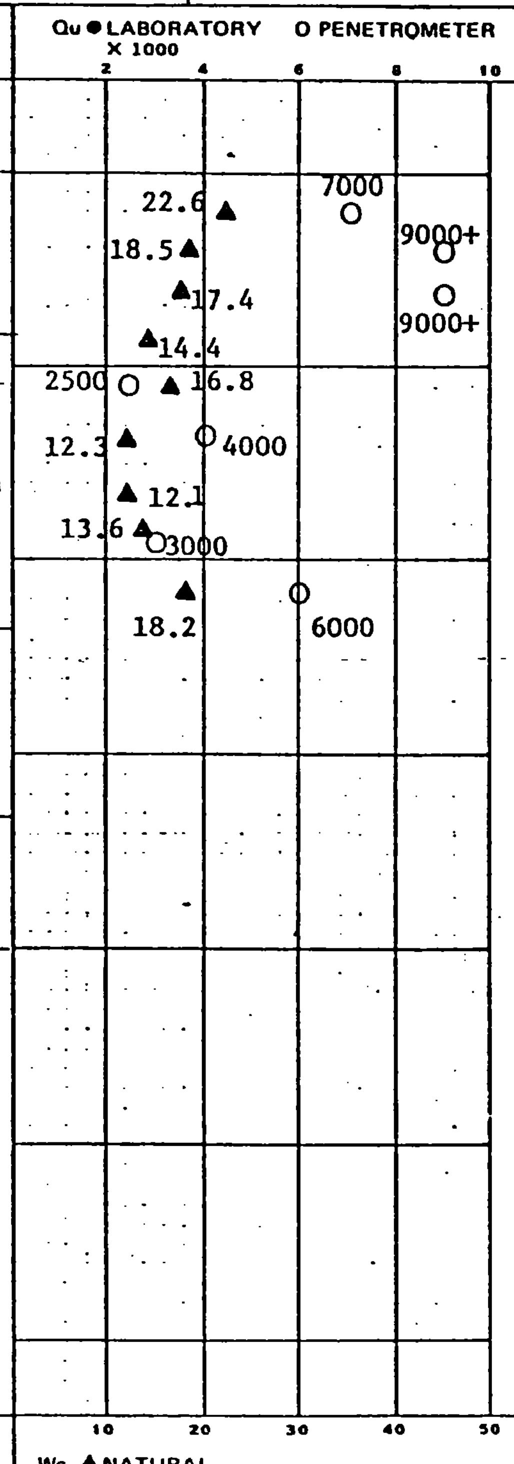
L-1

BEDROCK

FOR: Sexton Filling & Grading Corporation	SOIL BORING LOG NO. 7
PROJECT: 12100 West 31st Street	WALTER H. FLOOD & CO., INC. • Engineers • • CHICAGO • KALAMAZOO •
LOCATION Westchester, Illinois	

METHOD OF BORING: HS	WATER LEVEL READINGS	DATE OF BORING: 3-15-72
SPLIT SPOON SIZE: 2 IN.	23.5' W.D.	BY: BJ&JA:bc
WT. OF HAMMER 140 LBS.	17.7' B.C.R.	JOB NO.: 7205-0010
INCH DROP 30	10.0' A.C.R.	VERTICAL SCALE: 1"=10'
SHELBY TUBE SIZE	11.4'@24 HRS. AFTER DRILLING	
CASING USED 33'-2¼" IDHS	HRS. AFTER DRILLING	

ELEV.	DEPTH	S	T	N	L R	DD	DESCRIPTION
							Ground surface
657.0	0.0						Brown and gray clay, trace of small gravel, hard
		1	ss	14			
		2	ss	26			
		3	ss	33			
648.5	8.5	4	ss	12			Brown clayey small gravel, some fine to coarse sand, medium dense
646.0	11.0	5	ss	9			Gray clay, some small to medium gravel, occasional boulder, tough to very tough
		6	ss	15			
		7	ss	25			
		8	ss	13			
		9	ss	18			
633.5	23.5	10	ss	20			Gray small to large gravel, some silt, fine to coarse sand, dense to medium dense
		11	ss	20			
		12	ss	64			
		13	ss	69			
624.0	33.0						Grayish brown dolomite, thinly bedded, fractured, very dense
		14	C				
617.0	40.0						End of boring
ELEV.	DEPTH	S	T	N	L R	DD	DESCRIPTION



LEGEND: DEPTH—FEET BELOW GROUND SURFACE
S —SAMPLE NUMBER
T —TYPE OF SAMPLE
N —PENETRATION, BLOWS PER FOOT
L —SAMPLE LENGTH
R —LENGTH OF SAMPLE RECOVERED
DD —DRY DENSITY, LB. PER CU. FOOT

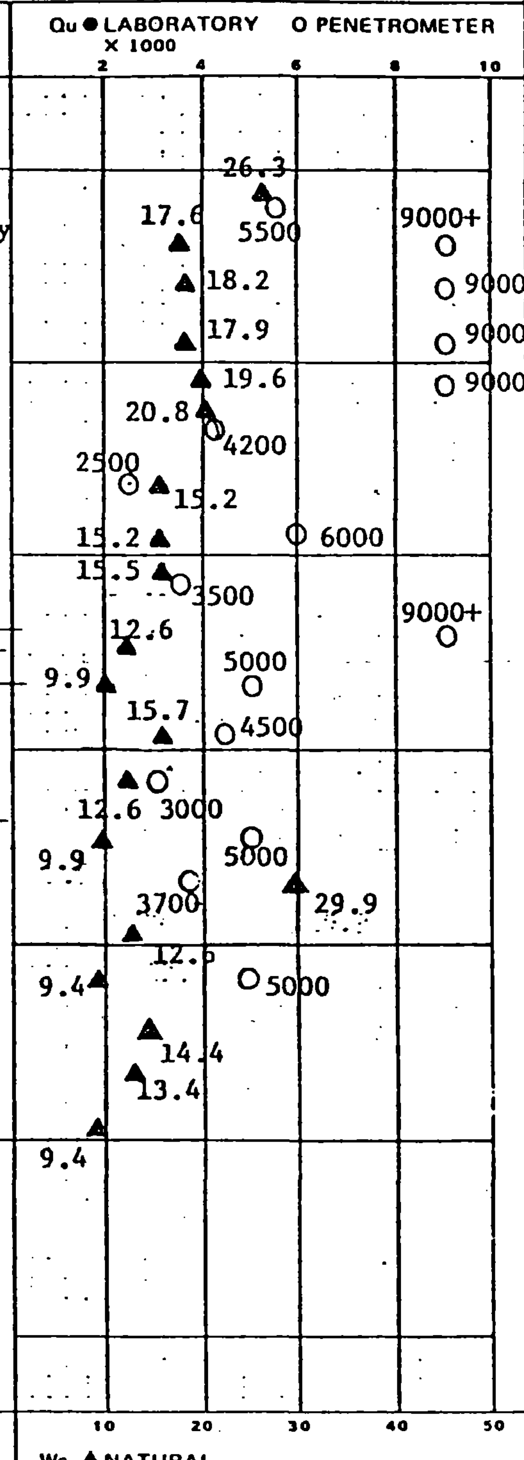
WO —WASHOUT
A —AUGER
HS —HOLLOW STEM AUGER
SS —SPLIT SPOON
ST —SHELBY TUBE
FT —FISH TAIL
C —CORE
Wc —WATER CONTENT PERCENT

BCR—BEFORE CASING REMOVAL
ACR—AFTER CASING REMOVAL
WD —WHILE DRILLING
WCI —WET CAVE IN
DCI —DRY CAVE IN
Qu —UNCONFINED COMPRESSIVE STRENGTH POUNDS PER SQUARE FOOT

FOR: Sexton Filling & Grading Corporation	SOIL BORING LOG NO. 8
PROJECT: 12100 West 31st Street	WALTER H. FLOOD & CO., INC. • Engineers • • CHICAGO • KALAMAZOO •
LOCATION Westchester, Illinois	

METHOD OF BORING: HS	WATER LEVEL READINGS	DATE OF BORING: 3-16-72	BY: BJ&JA:bc
SPLIT SPOON SIZE: 2 IN.	31.0' W.D.		
WT. OF HAMMER 140 LBS.	46.6' B.C.R.		
INCH DROP 30	29.0' A.C.R.		
SHELBY TUBE SIZE	16.2'@24 HRS. AFTER DRILLING		
CASING USED 50'-2¼" IDHS	HRS. AFTER DRILLING	JOB NO.: 7205-0010	VERTICAL SCALE: 1"=10'

ELEV.	DEPTH	S	T	N	L	R	DD	DESCRIPTION
661.0	0.0							Ground surface
		1	ss	19				Brown and gray clay, trace of small gravel, hard to very tough
		2	ss	27				
		3	ss	28				
		4	ss	31				
		5	ss	25				
		6	ss	14				
645.0	16.0	7	ss	10				Gray clay, trace of small to large gravel, occasional sand layer, tough to hard
		8	ss	16				
		9	ss	17				
627.2	33.8							Coarse sand layer
626.5	34.5	10	ss	29				See note
624.5	36.5	11	ss	106				Gray fine sand and silt, dense
		12	ss	14				
620.0	41.0	13	ss	69				Gray clay, trace of small to large gravel, very tough
617.5	43.5	14	ss	54				Gray silt, some fine to medium sand, small to large gravel, boulders, very dense
		15	ss	39				
		16	ss	50				
		17	ss	39				
		18	ss	77				
		19	ss	126				
611.0	50.0	20	ss	100				End of boring
								Note: Gray clay, trace of small gravel, tough to very tough



LEGEND: DEPTH—FEET BELOW GROUND SURFACE
S —SAMPLE NUMBER
T —TYPE OF SAMPLE
N —PENETRATION, BLOWS PER FOOT
L —SAMPLE LENGTH
R —LENGTH OF SAMPLE RECOVERED
DD —DRY DENSITY, LB. PER CU. FOOT
WO —WASHOUT
A —AUGER
HS —HOLLOW STEM AUGER
SS —SPLIT SPOON
ST —SHELBY TUBE
FT —FISH TAIL
C —CORE
Wc —WATER CONTENT PERCENT
BCR—BEFORE CASING REMOVAL
ACR—AFTER CASING REMOVAL
WD —WHILE DRILLING
WCI —WET CAVE IN
DCI —DRY CAVE IN
Qu —UNCONFINED COMPRESSIVE STRENGTH POUNDS PER SQUARE FOOT

BEDROCK

FOR: Sexton Filling & Grading Corporation

PROJECT: 12100 West 31st Street

LOCATION Westchester, Illinois

SOIL BORING LOG NO. 9

WALTER H. FLOOD & CO., INC.
• Engineers •
• CHICAGO • KALAMAZOO •

METHOD OF BORING: HS
SPLIT SPOON SIZE: 2 IN.
WT. OF HAMMER 140 LBS.
INCH DROP 30
SHELBY TUBE SIZE
CASING USED 20'-2¼" IDHS

WATER LEVEL READINGS
18.5' W.D.
19.0' B.C.R.
17.2' A.C.R.
17.0'@24 HRS. AFTER DRILLING
HRS. AFTER DRILLING

DATE OF BORING: 3-29-72 **BY:** BJ&JA:bc
JOB NO.: 7205-0010 **VERTICAL SCALE:** 1"=10'

ELEV.	DEPTH	S	T	N	L	R	DD	DESCRIPTION	Qu (LABORATORY / PENETROMETER) x 1000	Wc NATURAL
658.8	0.0							Ground surface		
657.8	1.0							Dark brown clay		
		1	ss	9				Brown and gray clay, trace of small gravel, tough to hard	3000 (penetrometer)	20.9
		2	ss	33					9000+ (penetrometer)	16.6
652.8	6.0	3	ss	11				Brown clayey fine sand, medium dense		
650.3	8.5	4	ss	10				Brown clay, trace of small gravel, tough	3000 (penetrometer)	19.0
647.8	11.0	5	ss	9				Gray fine to medium sand, some silt, clay, small to medium gravel, medium dense		
		6	ss	22						
642.8	16.0	7	ss	6				Gray silt, some fine sand, small gravel, loose		
640.3	18.5	8	ss	30				See note		
637.8	21.0	9	ss	100/½"				Light gray dolomite, thinly bedded, fractured, dense		
		10	C							
631.8	27.0							End of boring		

Note: Gray silt, some small to large gravel, stone fragments, occasional boulder, dense

Qu scale: 2, 4, 6, 8, 10 (x 1000); Wc scale: 10, 20, 30, 40, 50

LEGEND:
DEPTH—FEET BELOW GROUND SURFACE
S —SAMPLE NUMBER
T —TYPE OF SAMPLE
N —PENETRATION, BLOWS PER FOOT
L —SAMPLE LENGTH
R —LENGTH OF SAMPLE RECOVERED
DD —DRY DENSITY, LB. PER CU. FOOT
WO —WASHOUT
A —AUGER
HS —HOLLOW STEM AUGER
SS —SPLIT SPOON
ST —SHELBY TUBE
FT —FISH TAIL
C —CORE
Wc —WATER CONTENT PERCENT
BCR—BEFORE CASING REMOVAL
ACR—AFTER CASING REMOVAL
WD —WHILE DRILLING
WCI —WET CAVE IN
DCI —DRY CAVE IN
Qu —UNCONFINED COMPRESSIVE STRENGTH POUNDS PER SQUARE FOOT

BEDROCK

FOR:	Sexton Filling & Grading Corporation
PROJECT:	12100 West 31st Street
LOCATION	Westchester, Illinois

SOIL BORING LOG NO. 10

WALTER H. FLOOD & CO., INC.

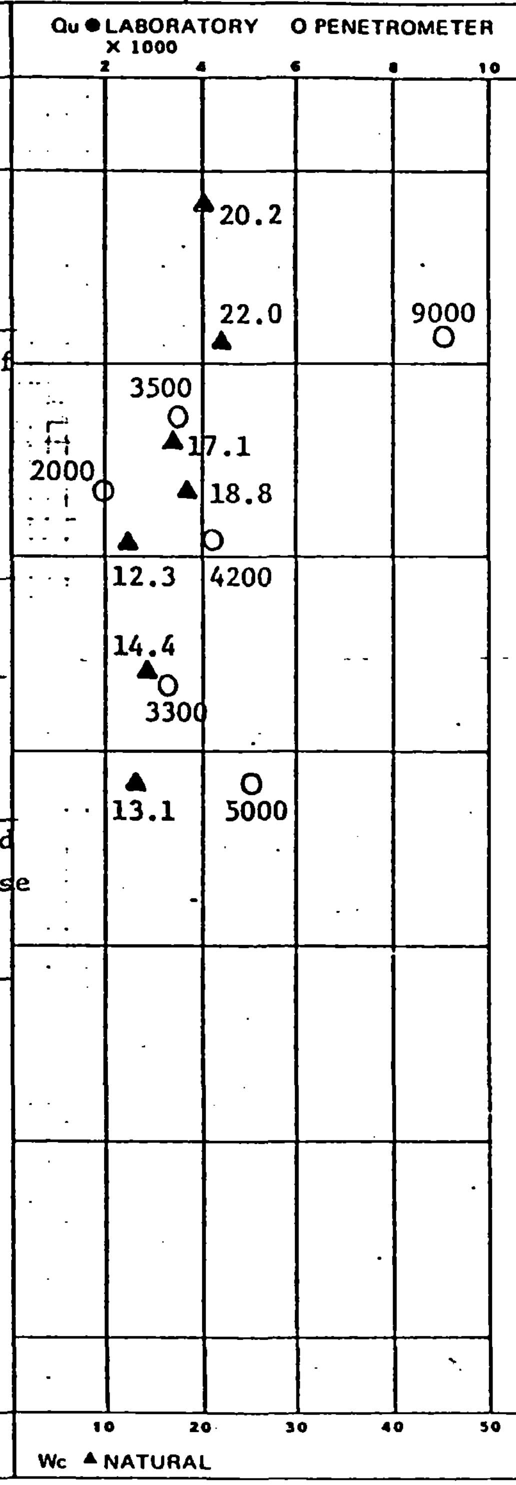
• Engineers •

• CHICAGO • KALAMAZOO •

METHOD OF BORING:	HS	WATER LEVEL READINGS	
SPLIT SPOON SIZE:	2 IN.	6.0'	W.D.
WT. OF HAMMER	140 LBS.	21.7'	B.C.R.
INCH DROP	30	20.5'	A.C.R.
SHELBY TUBE SIZE		5.7'@24	HRS. AFTER DRILLING
CASING USED	37'-2¼" IDHS		HRS. AFTER DRILLING

DATE OF BORING:	3-17-72	BY:	BJ&JA:bc
JOB NO.:	7205-0010	VERTICAL SCALE:	1"=10'

ELEV.	DEPTH	S	T	N	L	R	DD	DESCRIPTION
								Ground surface
656.5	0.0							
		1	ss	12				Fill, brown&black clay,wood
		2	ss	20				
		3	ss	7				
648.0	8.5							
		4	ss	22				Brown and gray clay, trace of small gravel, hard to very tough
		5	ss	12				
		6	ss	12				
		7	ss	12				
		8	ss	20				
635.5	21.0							
		9	ss	50/4"				Gray silt, some fine to coarse sand, small to large gravel, occasional boulder, very dense
		10	ss	100/2"				
630.5	26.0							
		11	ss	17				Gray clay, trace of small to large gravel, tough to very tough
		12	ss	21				
		13	ss	61				
623.0	33.5							
		14	ss	110				Gray silt,fine to coarse sand small to large gravel,boulders,stone fragments,very dense
		15	ss	100/3"				
619.5	37.0							
		16	C					Light gray dolomite, thinly bedded, fractured, dense
615.0	41.5							
								End of boring
ELEV.	DEPTH	S	T	N	L	R	DD	DESCRIPTION



LEGEND:
DEPTH—FEET BELOW GROUND SURFACE
S —SAMPLE NUMBER
T —TYPE OF SAMPLE
N —PENETRATION, BLOWS PER FOOT
L —SAMPLE LENGTH
R —LENGTH OF SAMPLE RECOVERED
DD —DRY DENSITY, LB. PER CU. FOOT

WO —WASHOUT
A —AUGER
HS —HOLLOW STEM AUGER
SS —SPLIT SPOON
ST —SHELBY TUBE
FT —FISH TAIL
C —CORE
Wc —WATER CONTENT PERCENT

BCR—BEFORE CASING REMOVAL
ACR—AFTER CASING REMOVAL
WD —WHILE DRILLING
WCI —WET CAVE IN
DCI —DRY CAVE IN
Qu —UNCONFINED COMPRESSIVE STRENGTH POUNDS PER SQUARE FOOT

BEDROCK

FOR: Sexton Filling & Grading Corporation	SOIL BORING LOG NO. 11
PROJECT: 12100 West 31st Street	WALTER H. FLOOD & CO., INC. • Engineers • • CHICAGO • KALAMAZOO •
LOCATION Westchester, Illinois	

METHOD OF BORING: HS	WATER LEVEL READINGS	DATE OF BORING: 6-14-72	BY: DL&BS:bc
SPLIT SPOON SIZE: 2 IN.	13.5' W.D.	JOB NO.: 7205-0010	VERTICAL SCALE: 1"=10'
WT. OF HAMMER 140 LBS.	11.6' B.C.R.		
INCH DROP 30	14.3' A.C.R.		
SHELBY TUBE SIZE	12.5'@24 HRS. AFTER DRILLING		
CASING USED 17'-2¼" IDHS	HRS. AFTER DRILLING		

ELEV.	DEPTH	S	T	N	L	R	DD	DESCRIPTION
								Ground surface
655.2	0.0							Black and gray silt, clay
654.2	1.0	1	ss	21				Gray silt, fine sand layers, medium dense
650.2	5.0	2	ss	20				
		3	ss	10				Brown fine to coarse sand, some silt, small to large gravel, medium dense
		4	ss	26				
645.2	10.0	5	ss	45				Brown silt, fine sand, small to large gravel, boulders
		6	ss	40				
		7	ss	34				
637.7	17.5	8	ss	100/2.5				Light gray and brown dolomite thinly bedded, fractured, dense
		9	C					
632.7	22.5							End of boring

Qu ● LABORATORY × 1000 O PENETROMETER: 2 4 6 8 10

Wc ▲ NATURAL: 10 20 30 40 50

LEGEND:

DEPTH—FEET BELOW GROUND SURFACE	WO —WASHOUT	BCR—BEFORE CASING REMOVAL
S —SAMPLE NUMBER	A —AUGER	ACR—AFTER CASING REMOVAL
T —TYPE OF SAMPLE	HS —HOLLOW STEM AUGER	WD —WHILE DRILLING
N —PENETRATION, BLOWS PER FOOT	SS —SPLIT SPOON	WCI —WET CAVE IN
L —SAMPLE LENGTH	ST —SHELBY TUBE	DCI —DRY CAVE IN
R —LENGTH OF SAMPLE RECOVERED	FT —FISH TAIL	Qu —UNCONFINED COMPRESSIVE STRENGTH POUNDS PER SQUARE FOOT
DD —DRY DENSITY, LB. PER CU. FOOT	C —CORE	
	Wc —WATER CONTENT PERCENT	

FOR: Sexton Filling & Grading Corporation	SOIL BORING LOG NO. 12 BEDROCK
PROJECT: 12100 West 31st Street	WALTER H. FLOOD & CO., INC. • Engineers • • CHICAGO • KALAMAZOO •
LOCATION Westchester, Illinois	

METHOD OF BORING:	HS	WATER LEVEL READINGS	
SPLIT SPOON SIZE:	2 IN.	10.0'	W.D.
WT. OF HAMMER	140 LBS.	9.1'	B.C.R.
INCH DROP	30	7.4'	A.C.R.
SHELBY TUBE SIZE		7.3'@24	HRS. AFTER DRILLING
CASING USED	15'-2¼" IDHS		HRS. AFTER DRILLING

DATE OF BORING:	6-14-72	BY:	DL&BS:bc
JOB NO.:	7205-0010	VERTICAL SCALE:	1"=10'

Qu ● LABORATORY O PENETROMETER X 1000 (2, 4, 6, 8, 10)

ELEV.	DEPTH	S	T	N	L	R	DD	DESCRIPTION
								Ground surface
651.6	0.0							See note
650.1	11.5	1	ss	17				Brown fine sand, some silt, medium dense
		2	ss	17				
		3	ss	22				
		4	ss	29				
641.6	10.0	5	ss	17				Gray silt, some fine to coarse sand, small to large gravel, boulders, medium to very dense
		6	ss	113				
636.6	15.0	7	C					Light gray dolomite, thinly bedded, fractured, dense
633.6	18.0							End of boring

Note: Gray silt, small to large gravel, boulders

ELEV.	DEPTH	S	T	N	L	R	DD	DESCRIPTION

Wc ▲ NATURAL (10, 20, 30, 40, 50)

LEGEND:
DEPTH—FEET BELOW GROUND SURFACE
S —SAMPLE NUMBER
T —TYPE OF SAMPLE
N —PENETRATION, BLOWS PER FOOT
L —SAMPLE LENGTH
R —LENGTH OF SAMPLE RECOVERED
DD —DRY DENSITY, LB. PER CU. FOOT
WO —WASHOUT
A —AUGER
HS —HOLLOW STEM AUGER
SS —SPLIT SPOON
ST —SHELBY TUBE
FT —FISH TAIL
C —CORE
Wc —WATER CONTENT PERCENT
BCR—BEFORE CASING REMOVAL
ACR—AFTER CASING REMOVAL
WD —WHILE DRILLING
WCI —WET CAVE IN
DCI —DRY CAVE IN
Qu —UNCONFINED COMPRESSIVE STRENGTH POUNDS PER SQUARE FOOT

BEDROCK

FOR:	Sexton Filling & Grading Corporation
PROJECT:	12100 West 31st Street
LOCATION	Westchester, Illinois

SOIL BORING LOG NO. 13

WALTER H. FLOOD & CO., INC.

• Engineers •

• CHICAGO • KALAMAZOO •

METHOD OF BORING:	HS	WATER LEVEL READINGS	
SPLIT SPOON SIZE:	2 IN.	13.5'	W.D.
WT. OF HAMMER	140 LBS.	10.8'	B.C.R.
INCH DROP	30	11.9'	A.C.R.
SHELBY TUBE SIZE		12.2'@24	HRS. AFTER DRILLING
CASING USED	22'-2¼" IDHS		HRS. AFTER DRILLING

DATE OF BORING:	6-14-72	BY:	DL&BS:bc
JOB NO.:	7205-0010	VERTICAL SCALE:	1"=10'

ELEV.	DEPTH	S	T	N	L	R	DD	DESCRIPTION	Qu ● LABORATORY ○ PENETROMETER (X 1000)	Wc ▲ NATURAL
651.2	0.0							Ground surface		
		1	ss	13				Gray clay, trace of small to large gravel, very tough	6000	17.4
		2	ss	11					5000	18.2
		3	ss	29					5000	17.1
643.7	7.5	4	ss	18				See note 1		
641.2	10.0	5	ss	7				Gray clayey silt, trace of small gravel		
638.7	12.5	6	ss	23				See note 2		
636.2	15.0	7	ss	26				Gray fine sand, trace of silt, medium dense		
633.7	17.5	8	ss	28				Gray silt, some fine to coarse sand, small to large gravel, boulders		
		9	ss	100/5"						
628.7	22.5	10	C					Light gray dolomite, thinly bedded, fractured, dense		
623.7	27.5							End of boring		

Note 1: Gray medium sand, some silt, small to large gravel, boulders, medium dense

Note 2: Gray fine to medium sand, some silt, small to large gravel, medium dense

LEGEND:
DEPTH — FEET BELOW GROUND SURFACE
S — SAMPLE NUMBER
T — TYPE OF SAMPLE
N — PENETRATION, BLOWS PER FOOT
L — SAMPLE LENGTH
R — LENGTH OF SAMPLE RECOVERED
DD — DRY DENSITY, LB. PER CU. FOOT
WO — WASHOUT
A — AUGER
HS — HOLLOW STEM AUGER
SS — SPLIT SPOON
ST — SHELBY TUBE
FT — FISH TAIL
C — CORE
Wc — WATER CONTENT PERCENT
BCR — BEFORE CASING REMOVAL
ACR — AFTER CASING REMOVAL
WD — WHILE DRILLING
WCI — WET CAVE IN
DCI — DRY CAVE IN
Qu — UNCONFINED COMPRESSIVE STRENGTH POUNDS PER SQUARE FOOT

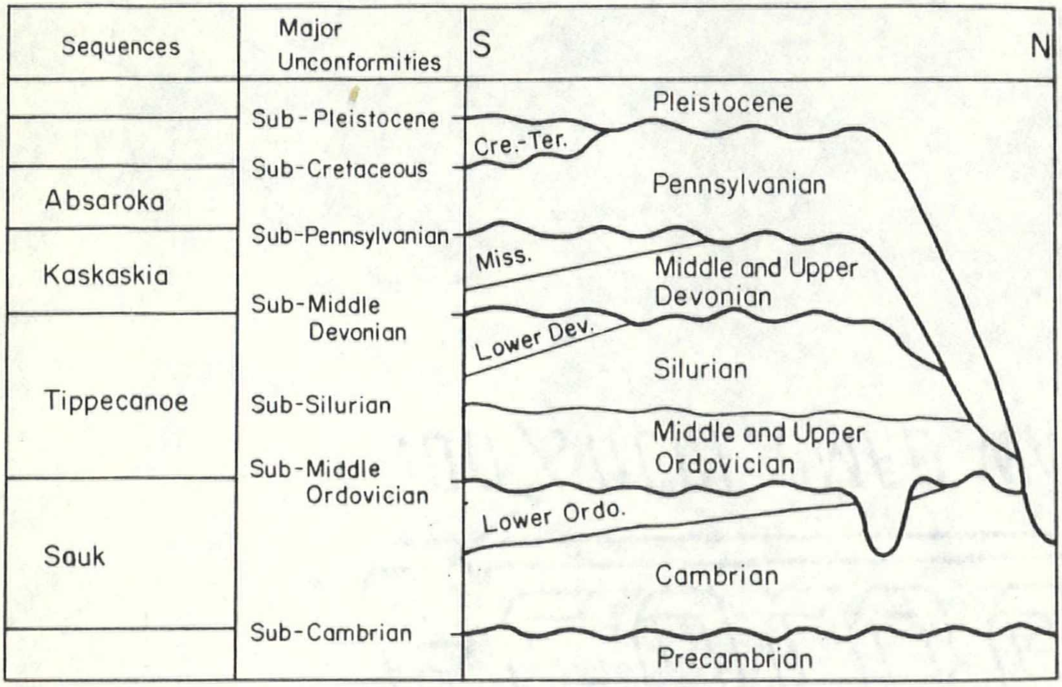


Fig. 6 - Diagrammatic cross section from southern to northern Illinois showing major unconformities and named sequences.

that the Henry Formation is Wisconsinan in age, but the Henry Formation is a rock-stratigraphic unit, not a subdivision of the Wisconsinan Stage. It is differentiated from other formations because of its composition and not because of its age.

STRATIGRAPHIC RELATIONS

Most of the stratigraphic units in the Chicago area have a conformable relation, that is, no significant interruptions in deposition took place. Even though the composition of the sediment changes at the contact between the units, deposition was essentially continuous. At many contacts, however, the lower unit was partly or completely eroded before the overlying sediment was deposited. Contacts where deposition was interrupted and beds are missing are unconformities.

Where the beds above and below an unconformity are essentially parallel, the unconformity is called a disconformity, and where the lower beds were tilted before overlying beds were deposited, the contact is called an angular unconformity. The contact between the Silurian and Ordovician rocks in the Chicago area is a disconformity, whereas the Silurian and Pennsylvanian rocks dip slightly in opposite directions and the contact between them is an angular unconformity.

Minor unconformities that are of limited extent and represent no great amount of erosion occur between some units, particularly the units differentiated in the glacial deposits. Sharp, undulating contacts between and within many units may be depositional features; they are not unconformities unless there is evidence that beds are missing.

The major unconformities, as previously noted, are used to differentiate units called sequences. A diagrammatic cross section from southern to northern Illinois (fig. 6) shows the stratigraphic relations of the sequences, although it distorts their thicknesses and dips. It reveals the major tectonic events (vertical or tilting movements) and the erosional events in the geologic history of the area. These events are summarized below: